DOCUMENT RESUME

ED 058 508 AA 000 812

AUTHOR	Greenwood, P. W.; Weiler, D. M.
TITLE	Alternative Models for the ERIC Clearinghouse Network.
INSTITUTION	Rand Corp., Santa Monica, Calif.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
REPORT NO	R-951-HEW
PUB DATE	Jan 72
CONTRACT	OEC-0-71-4647
NOTE	92p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Clearinghouses; Information Networks; *Information Systems; Interviews; *Literature Reviews; *Models; Objectives; *Organizational Change; Professional Occupations; Program Evaluation; Research; Surveys
IDENTIFIERS	*Educational Resources Information Center; ERIC

ABSTRACT

The National Center for Educational Communication (NCEC) contracted with Rand to develop a range of potential objectives and structures for the Educational Resources Information Center (ERIC) system that could render it more effective in the future. The Rand study team surveyed the scope and sources of education literature and studied the operations of the current ERIC system. Team members conducted numerous interviews with researchers, educators, officials at USOE and HEW, managers of Information Resource Centers, Clearinghouse (CH) directors and staffs, and people in relevant professional associations. Findings include: (1) The literature dealing with education is characterized by high volume, narrow focus, and findings that are often conflicting; (2) Practicing educators rely heavily for information on face-to-face communication with colleagues; (3) Besides ERIC, hundreds of journals, newsletters, and indexing services vie for the user's attention; and (4) Relatively few educators appear to have more than passing familiarity with ERIC. The following set of six alternative system models were developed: (1) A procedural Change Model, in which changes are made in the operating procedures; (2) A Divisional Model, in which a second level of management is inserted between Central ERIC and the existing CHs; (3) A Consolidated Model, in which the current 19 CHs are merged to form 8; (4) A Functional Model, which distinguishes 7 CH domains; (5) A Centralized Model; and (6) A Regional Model. (Author/CK)

ED 058 508

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Alternative Models for the ERIC Clearinghouse Network

P. W. Greenwood and D. M. Weiler

A Report prepared under a Grant from

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Rand

SANTA MONICA, CA. 90406

This report was sponsored by the U. S. Office of Education under Contract OEC-0-71-4647. Views or conclusions contained in this study should not be interpreted as representing the official opinion or policy of Rand or of the Department of Health, Education and Welfare.

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PREFACE

This Report presents the results of a five-month study undertaken for the National Center for Educational Communication, U.S. Office of Education. Its purpose is to provide NCEC with exemplary alternative models for the ERIC Clearinghouse network that could render ERIC more responsive to the needs of the education community.

This work has benefited from conversations with many people both within the ERIC system and among its users; we gratefully acknowledge their assistance. Sue Haggart, Marjorie Rapp, Darien Roseen, and Terry Saario, members of the Rand staff, participated in the interviews with education and ERIC system personnel and contributed to the formulation of this Report, as did Professor Dale Mann of Columbia Teachers College.

The Report also benefited greatly from comments by Roger Levien, John Pincus, and Milbrey McLaughlin of Rand, and by Conrad Briner, Professor of Education at the Claremont Graduate School. Appendix A was written by Darien Roseen of Rand.

SUMMARY

The Educational Resources Information Center (ERIC) is a national information system created by the U.S. Office of Education in 1965. Its purpose is to aid education researchers and practitioners through the publication of indexes and abstracts of education literature, and the sale of microfiche and hard copy reproductions of documents. It is a decentralized system consisting of 19 clearinghouses (CHs), each run by a private contractor and specializing in the acquisition and processing of a particular subset of the educational literature. The system concentrates on the acquisition of so-called fugitive literature--documents not commonly visible through journal publication or library acquisition--and deals primarily with intermediate information centers or libraries, rather than directly with users. The CHs also produce information analysis products--bibliographies, research reviews, and the like--that are available through the ERIC system.

In recent years, as the ERIC system has continued to grow and national education interests have shifted, USOE staff in the National Center for Educational Communication (NCEC), which manages ERIC, have become concerned about the system's ability to respond effectively to new issues that cut across or fall outside of the domains of the existing CHs. At the same time, new Federal initiatives on the immediate horizon--in particular, the proposed National Institute for Education (NIE) and USOE's teacher renewal strategy--make it desirable to reevaluate ERIC's role.

As a result of these concerns, NCEC contracted with Rand to develop a range of potential objectives and structures for ERIC that could render the system more effective in the years ahead.

The Rand study team surveyed the scope and sources of education literature, analyzed the utility to the user of existing and planned non-ERIC information resources, and studied the operations of the current ERIC system. Team members conducted numerous interviews with researchers, educators, officials at USOE and HEW, managers of Information Resource Centers and similar agencies, CH directors and staffs,

and people in relevant professional associations.* The findings of this phase of the study are as follows:

1. The literature dealing with education is characterized by high volume, narrow focus, and findings that are often conflicting, internally inconsistent, or not relevant to the real problems of education practice. The literature is rich in theory, hypotheses, and judgmental evaluations, and weak in scientifically verified propositions and reliable program evaluations. Practical experiences and research findings that appear to have yielded valid results are rarely synthesized for use by educational planners, and almost never translated into specifications for operating programs.

2. Practicing educators rely heavily for information on face-to-face communication with colleagues, anecdotal information, and the advice of other educators personally known to the information seekers. It appears, then, that existing formal information resources, whatever their limitations or virtues, are seriously underutilized. The following are possible reasons:

- Much available information is not practically visible; either the search tools are inadequate, or usable references are scattered among multiple sources.
- Much visible information is not quickly, easily, and cheaply accessible.
- Accessible information is rarely available in a format that has practical utility.
- The low reliability of much of the information is well known to educators.
- Educators are not trained in information retrieval skills, and rarely have access to information specialists who can assist them.

3. The world of educational information resources is complex and confusing. Besides ERIC, hundreds of journals, newsletters, indexing services, publishers, research establishments, and information centers

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*After reviewing the literature and consulting a number of key knowledgeable professionals, the Rand study team drew up a representative list of people who were familiar with various aspects of the subject area. A list of those interviewed will be found in Appendix B.

vie for the user's attention. Important services and products are provided by Federal, state, and local government agencies, private corporations, government-sponsored research organizations, and universities. Both redundancy and glaring omissions occur in this profusion, quality is irregular, and there is little coordination among producers, processors, and disseminators of information.

4. Given the total size of the education research and practice communities, relatively few researchers and educators appear to have more than passing familiarity with ERIC. Of those who do know about the system, many choose not to use it, or do not know how to use it effectively. Whether the fault is theirs or ERIC's, there is considerable -- though by no means uniform -- dissatisfaction with the quality of ERIC's products and services. Dissatisfaction is less when users employ competent information specialists as mediators between their needs and the ERIC data base. High-confidence estimates of the percentages of users who fit these descriptions are not possible on the basis of available data.

5. ERIC's coverage is fairly broad, but the system as a whole rarely covers a given topic in complete depth. There are also significant and growing gaps in its acquisition program, particularly for new topics that cut across several CH domains. The system is especially deficient in collecting locally generated literature on educational practice. In general, the system's information analysis products are not widely visible to users; they are returned to the ERIC system and become part of the common data base. Only a small fraction of these documents are written for policymakers.

6. The organization and size of CHs, and the criteria for assigning CH topic responsibilities engender troublesome management problems:

- It is difficult to insure that the system as a whole is covering all the literature of interest to educators and researchers.
- It is difficult to insure that any given CH is adequately covering its assigned topic responsibilities.
- It is difficult to insure that high-priority topics are receiving proper attention.
- It is difficult to maintain effective communications between CH directors and Central ERIC.

- Although CH directors are highly knowledgeable about ERIC's day-to-day problems, they lack the resources and incentives to attack system-wide problems.
- The assignment of new topic responsibilities almost always requires some degree of arbitrary choice among a number of candidate CHs.

These findings have a number of important implications for USOE decisions regarding the management, organization, objectives, and activities that should characterize the ERIC system in the years to come. A number of policy issues emerge:

- What user groups should ERIC serve?
- What activities should ERIC pursue to maximize its services to these users, in view of the availability of numerous other information sources?
- So that ERIC can (1) become more flexible and responsive over the next decade, and (2) provide the services deemed necessary for its preferred clients:

  How should ERIC change its management policies?

  How should ERIC be organized and structured?

These issues are mutually dependent, of course, but the salient question is that of ERIC's proper objectives (whom should the system serve, and what should it do?). The objectives chosen will strongly influence ERIC's organization and structure, and vice versa.

To clarify ERIC's policy options, we deliberately expanded the scope of our study to consider a range of objectives that would be appropriate for a total education information system. Some would be suitable for ERIC; others might best be pursued by other institutions and components of the total system. The essential problem for ERIC is to define its own place in the spectrum.

We formulated our set of information system objectives by considering the relationship between overall system functions and user groups. It is clear that for some system functions, the level of skills and resources required will largely depend on the composition of the user groups to be served; for other functions, resource allocation is independent of user groups. Overall system objectives derive from these relationships. We treat system functions as clusters of products, services, and related activities, with each cluster requiring a discrete set of skills, management arrangements, and resources.

Thus, each cluster -- each system function -- represents a reasonably clear policy option for ERIC management.

After considering a list of six potentially interesting user groups, we concluded that from the point of view of user demands on the system, user groups are enough alike to permit consideration of only two broad user categories: researchers and practitioners. And after surveying the relationships among seven identifiable system functions and the two user groups, we derived a list of 10 potential information system objectives for ERIC. We list them in increasing order of complexity:

I. PROVIDE ACCESS TO FUGITIVE RESEARCH AND OCCASIONAL LITERATURE.

II. PROVIDE ACCESS TO FUGITIVE RESEARCH AND OCCASIONAL LITERATURE, PRACTICE AND COMMERCIAL LITERATURE, AND CURRICULUM MATERIALS.

III. REVIEW AND EVALUATE RESEARCH AND PRACTICE LITERATURE.

IV. REVIEW AND EVALUATE RESEARCH AND PRACTICE LITERATURE, COMMERCIAL LITERATURE, AND CURRICULUM MATERIALS.

V. SYNTHESIZE AND SUMMARIZE RESEARCH AND PRACTICE LITERATURE.

VI. PROVIDE QUERY RESPONSE FOR RESEARCHERS AND PRACTITIONERS.

VII. PROVIDE PERSONALIZED SERVICES FOR RESEARCH COMMUNITY.

VIII. PROVIDE PERSONALIZED SERVICES FOR PRACTITIONERS.

IX. TRANSLATE RESEARCH AND PRACTICE RESULTS INTO PRACTICAL GUIDES FOR PRACTITIONERS.

X. ACT AS EDUCATIONAL CHANGE AGENTS.

Turning to the second major policy issue -- how ERIC should be structured -- we developed the following set of six alternative system models, in which we introduce changes in the number of CHs in the system, the domain of each CH, the level of service to be provided by each, and the internal and external system linkages:

1) A Procedural Change Model, in which changes are made only in the operating procedures and functional emphasis of the existing CHs.

2) A Divisional Model, in which a second level of management (Divisions) is inserted between Central ERIC and the existing CHs to coordinate the activities and products of CHs serving similar user groups.

3) A Consolidated Model, in which the current 19 CHs are merged to form only 8, with the addition of a New Concepts CH to handle new topics that cut across traditional domains.

4) A Functional Model, which distinguishes only 7 CH domains concerned with either classroom instruction or instructional support.

5) A Centralized Model, which consists of a large Core CH covering those subjects of more routine or general interest, plus a few specialized CHs to meet the needs of special user groups or to cover areas of priority interest.

6) A Regional Model, which contains a functional set of CHs to acquire, review, and synthesize the research and practice literature, plus a regional network of CHs to service the information needs of practitioners and researchers, primarily through an associated chain of information centers or teacher renewal centers.

As we proceed down this list, each successive model introduces more comprehensive changes to the existing structure, beginning with changes in procedures and management roles, leading to changes in the number and domain of CH charters, and ending with changes in the system boundaries.

In addressing the question of how USOE should proceed in selecting a course of action, we suggest at least the following three criteria to be used in comparing the models:

- How well each model satisfies the system's objectives, considering their relative priority
- The managerial convenience of each model in terms of future flexibility and system development
- The transition costs incurred in restructuring the system

In order to apply the first criterion -- the performance of each model as measured against the system's objectives -- we suggest a scaling technique that involves:

- Assigning relative scores (from 0 to 100) to each model for each objective, which reflect technical judgments of how the system will perform;
- Assigning weights to each objective that reflect their relative importance; and
- Summing the products of the objective weights and the model scores to get a total model score that indicates the aggregate effectiveness of each model.

Members of the Rand project staff familiar with CH operations assessed the potential performance of each model by considering the processing and communication efficiencies inherent in each design, as well as the skills and interests of the staff that each model would be likely to attract.

Members of the NCEC staff performed the weighting of system objectives by considering the extent to which desirable objectives are being met elsewhere, the available staff and management talent within the current structure, and the political constraints imposed by their organizational role. The resulting model scores indicate that the Consolidated, Functional, and Regional Models best meet the desired mix of objectives.

In conclusion, the available evidence suggests that:

1. Simply increasing the supply of primary literature will have little benefit unless more careful attention is paid to its evaluation and synthesis; therefore, evaluating and synthesizing the data base should be a minimum system objective.

2. The most glaring deficiency in current education literature is the lack of documents translating preferred programs and research findings into operational advice to practitioners.

3. Either the Consolidated or the Functional Model appears to offer immediate improvements in responsiveness without requiring undue transition costs. The Procedural Change, Divisional, and Centralized Models would each be deficient in important respects; the Regional Model is downgraded primarily because of probable transition and resource problems that need not be faced in order to meet these objectives.

4. Moving into the query response or service roles entails a considerable expansion of the management responsibilities and skills required in the network, and considerably more funds; yet we believe that someone will have to fulfill these objectives if the extension agents and teaching centers are to succeed.

5. If query response and personal service objectives are given higher priority at some later date, some form of the Regional Model should prove most effective; this Model could be implemented over the long term, using the Functional Model as the structural groundwork.

6. Whatever model and objectives are chosen, the findings indicate that some effort should be made to improve the interfaces between ERIC and other information resources, and that greater attention should be devoted to tailoring ERIC's products to its intended audience and evaluating the system's overall effectiveness.

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I. INTRODUCTION

The Educational Resources Information Center (ERIC) is a national education information network managed by USOE's National Center for Educational Communication (NCEC).* ERIC is highly decentralized; operating responsibilities rest with 19 clearinghouses (CHs), each specializing in literature on a single topic. They are operated under contract with the U.S. Office of Education by a variety of nongovernmental organizations. (See Table 1.)

The average CH budget is about $200,000 a year. The tasks of the operating staff are to acquire documents published on their topic, index and abstract them for input to the monthly issues of Research in Education (RIE), index articles from a number of journals, and produce information analysis products such as special bibliographies, research reviews, and state-of-the-art papers. Documents in the ERIC data base can be purchased from an independent contractor in either hard copy or microfiche reproductions.

ERIC's decentralized CH structure has enabled it to develop close working relationships with a variety of educational interest groups, both in acquiring pertinent fugitive documents and in identifying the information needs of the various user communities. These benefits notwithstanding, this organizational form raises a number of troublesome management problems for the Central ERIC staff. In particular, the staff is concerned over how to insure:

1. That the CHs are collectively covering all the literature of interest to educators.

2. That proper attention is paid to high-priority topics.

3. That each CH is adequately covering the literature on its topic.

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*For a detailed description, see Journal of Educational Data Processing, Vol. 7, No. 2, April 1970.

Table 1

CURRENT CLEARINGHOUSE NETWORK

Clearinghouse	Location	Sponsor/ Contracting Organization
Adult Education	Syracuse, N.Y.	Syracuse University
Counselling & Guidance	Ann Arbor, Mich.	University of Michigan
Educational Management	Eugene, Ore.	University of Oregon
Exceptional Children	Arlington, Va.	Council for Exceptional Children
Media & Technology	Palo Alto, Calif.	Stanford University
Foreign Language & Linguistics	New York, N.Y.	Modern Language Assn.
Higher Education	Washington, D.C.	George Washington Univ.
Junior Colleges	Los Angeles, Calif.	UCLA
Library & Information Sciences	Washington, D.C.	American Society for Information Sciences
Early Childhood	Urbana, Ill.	University of Illinois
Rural Education & Small Schools	Las Cruces, N.M.	New Mexico State Univ.
Reading	Bloomington, Ind.	Indiana University
Science & Math	Columbus, Ohio	Ohio State University
Social Science	Boulder, Colo.	University of Colorado
Teacher Education	Washington, D.C.	American Assn. of Colleges for Teacher Education
Teaching of English	Urbana, Ill.	National Council of Teachers of English
Tests, Measurement & Evaluation	Princeton, N.J.	Educational Testing Service
Urban Disadvantaged	New York, N.Y.	Columbia University
Vocational & Technical Education	Columbus, Ohio	Ohio State University

Much of the feedback that Central ERIC receives on these questions is necessarily anecdotal, with considerable (albeit understandable) risk of bias and inaccuracy. Not surprisingly, the users most likely to comment on the quality of ERIC are those who cannot find what they want. In the last few years, as the number of CHs has continued to grow, Central ERIC has become concerned with the system's ability to respond adequately to new issues that cut across or fall outside of the traditional specialty areas. As the focus of national interests continues to shift, concern has increased that the CH network may be slipping out of touch with the key issues of the day. NCEC management accordingly resolved that ERIC had to become more responsive to the needs of educational information users in the 1970s. At the same time, it seemed likely that any USOE decisions regarding the ERIC system would have to be made within the context of (1) new OE initiatives in providing information resources to teachers (Teacher Renewal Centers), and (2) the emergence of the National Institute for Education (NIE) as the focal point for all Federally supported and directed education research efforts. While the effects of these developments on future ERIC operations were not entirely clear, it was apparent that any reorganization or restructuring of ERIC would have to take these and other planned developments into serious account, to avoid wasteful redundancy of effort and maximize effective coordination and mutual support.

As a result of these concerns, NCEC contracted with Rand to develop a range of possible system objectives and alternative structures that would help to clarify USOE's decision options with regard to ERIC's role over the next decade.*

The last major analysis of the CH network was performed by the American Institutes for Research (AIR) in 1968.** It consisted

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*Rand staff had recently completed an extensive planning effort for the proposed NIE, in the course of which they had become familiar with the Federal plans and initiatives that also had to be taken into account as part of this analysis.

**Erwin W. Bedarf and Arthur L. Korotkin, Research and Analysis to Define Clearinghouse Requirements for the 1968-71 ERIC System, American Institutes for Research, Silver Spring, Maryland, January 1969.

primarily of an analysis and evaluation of the supply of educational research literature, carried out in consultation with experts in education. This analysis resulted in the recommended structure shown in Table 2. Although the current CH structure reflects a few of these changes, most of them were never adopted because OE was apparently not convinced that the new structure would improve matters enough to justify the effort and potential turmoil that reorganization would entail.

Another study of ERIC with direct implications for this effort was conducted by the Management Review Group in 1970. This ad hoc task force was commissioned to review policies established by Central ERIC for the regulation of the CH network. Their final report suggested that the following three issues affecting the future role of the CH network needed resolution:

- The relative emphasis to be placed on serving different user groups.
- The relative value of reports literature versus curriculum and teaching materials.
- The role of the CH in providing direct user services.

Policy choices on each issue will have a bearing on the relative utility of different CH structures; our job in this study has been to display these relationships within the context of related policy options for ERIC. With the hindsight provided by previous studies, we based our analysis on three different perspectives:

- After reviewing the experiences of ERIC and similar information systems, we evaluated alternative structures according to how they might affect the management of routine processing operations, such as document selection or the commissioning of information analysis products.
- After reviewing the literature of education and interviewing many professional educators and educational researchers, we evaluated alternative ERIC structures according to how responsive they are likely to be to emerging trends.

Table 2

CHANGES RECOMMENDED BY THE AIR STUDY

CH Structure at the Time of AIR Study	AIR Recommended Structure
Library & Information Sciences	Library & Information Sciences
Exceptional Children	Special Education
Disadvantaged	Disadvantaged
Adult & Continuing Ed	Adult & Continuing Ed
Vocational & Technical Ed	Occupational & Technical Ed
Counseling & Personnel Services	Pupil Personnel Services
Early Childhood Education	The Characteristics of the Individual
Rural Education & Small Schools	Tests & Measurement
Junior Colleges	General & Inter-Disciplinary Curriculum
Higher Education	Curriculum of Arts, Humanities, and Social Sciences
Educational Administration	Professional Concerns of Education
Educational Facilities	Societal Roles in Education
Reading	Higher Education
Teaching of Foreign Languages	Educational Management
Linguistics and the Uncommonly Taught Languages	Curriculum of English & Communication Skills
	Curriculum of Foreign Languages & Linguistics

- Finally, after reviewing many ongoing projects that attempt to make ERIC materials more directly relevant to practitioners' needs, we evaluated alternative structures according to how well they serve the requirements of various user groups.

We quickly discovered that quantitative data were sparse on the nature of the current user population, how they used information, or their satisfaction with the information sources at their disposal. Likewise, the wide variations in accounting practices among CHs did not allow us to derive quantitative insights into the cost-effects of marginal changes in CH practices.

Our initial steps led us to the literature on educational communication and innovation, a process about which there appears to be some consensus. From there we went into the field to talk with CH staffs and representatives of a variety of user groups, soliciting opinions on how well the current system works, suggestions for improvement, and reactions to our alternative models.

The structure of this Report follows that of a briefing given to the NCEC staff on November 7, 1971. Section II summarizes our understanding of evidence bearing on ERIC's role in a larger Federal education communication effort, and expresses opinions on the part it should play and on its current success in serving its intended purpose. Section III discusses the potential system objectives ERIC could pursue. Each objective implies an associated set of implementing services and products against which alternative models of the ERIC structure can later be measured. Section IV presents a sequence of six configurations ERIC could assume. These cover the range from today's structure with slight changes in operating procedure, through smaller networks with changes in the CH taxonomy, to abandonment of the topic domains for a system concentrating on the provision of services on a regional basis. Section V compares the six new models in terms of their potential effectiveness in meeting the objectives, their managerial convenience, and the problems of transition.

II. EDUCATION INFORMATION AND THE ERIC SYSTEM: A SUMMARY OF THE EVIDENCE

This study centers on two issues: What should ERIC do? How should ERIC be organized?

The first question involves the identification of specific services to be performed for particular clients, and can be discussed only in reference to the much larger field of education information, in which ERIC plays but a part. The second concerns the CH structure and the allocation of tasks and resources across the system. Sections III and IV address these issues separately. The present section summarizes evidence and opinions pertinent to the analysis. This material is presented in three parts:

1) Evidence on the nature of education information: its sources, its content, the media by which it is conveyed, and its recipients;

2) Opinions of the education community on what ERIC should be doing; and

3) Evidence on how well ERIC is currently performing.

EDUCATION INFORMATION

Apparently, education practitioners communicate primarily through face-to-face discussion with colleagues, and only secondarily through newsletters, journals, and the report literature. Researchers also tend to communicate through close colleagues or a few favorite journals. Consequently, since ERIC deals primarily with the report and journal literature, it is difficult to measure the influence it has on its target audience.

The nature of the literature appears to account for much of this audience bias. It is rich in theory, hypotheses, opinions, and highly judgmental evaluations of vaguely defined programs. It is noticeably weak in objectively verified and evaluated programs and in clear, consistent advice to the practicing educator. Therefore, it is not surprising to find that policy-oriented researchers and innovative practitioners will turn to printed sources for information only with reluctance, preferring instead their trusted personal contacts.

The educator who does turn to printed sources confronts a mountainous literature. Books in Print currently lists about 3,500 titles under Education. CIJE completely indexes more than 200 journals and partially indexes some 300 more. The ERIC RIE data base now contains over 26,000 entries and adds over 6,000 titles a year.

With all this material vying for their attention, many educators ignore all but what personal experience has shown to be most essential or most interesting. But because personal experience is so idiosyncratic, it is unusual to find large numbers of educators with common inquiry patterns. In addition, much of the material that comes to their attention does so strictly as a matter of chance.

Educators show a strong proclivity to organize around a wide variety of professional interests. USOE's Education Directory lists over a thousand national, regional, and state associations, most of which publish material for their membership, and many of which engage in research and education programs. In addition, many local unions and associations communicate periodically with their members.

To find his way through this maze of material, the educator can turn to numerous information resource aids. A project designed to produce a handbook that would identify these resources discovered 23 guides and directories, 4 multidisciplinary information centers, 32 specialized information centers, 12 data depositories, and 63 abstracting and indexing services.

Even confining the search to a specific problem does not appreciably simplify the researcher's task. For example, in a discussion of the available sources for information on education innovation, Havelock lists 23 newsletters, 7 information services, 12 directories or indexes, 7 consulting organizations, and a variety of academic institutions, government agencies, human resources, and professional organizations.*

In summary, no matter how well-conceived or executed an information communication effort may be, continuous attention must be devoted

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*Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge, Institute for Social Research, University of Michigan, July 1969.

to its interface with users if it is not to be lost in the welter of other information sources.

OPINIONS ABOUT ERIC'S ROLE

Interviews with members of the education community revealed divergent views about what ERIC should be trying to accomplish. These views are summarized below.

The Associations

Association interests are apparent in the demands they place on CH staffs and the influences they attempt to exert on the system. In general, associations view the CHs as helping to keep their members informed about what is going on in the field: What educators and researchers are doing and saying, and what the results of experiments have been.

Practitioners

Those practitioners who seek information through a formal system would like to receive practical answers to current problems through telephone inquiry with an expert whose credentials they trust. The ones who are served through well-staffed information centers are relatively happy. Those who attempt to get such services from a CH are not. We know of no evidence that many practitioners will conduct literature searches on their own.

Researchers

Because much of the education research literature is characterized by highly judgmental and inconsistent findings, it is almost always possible to find at least one study that supports any particular point. The careful researcher strives to winnow out the high-quality studies on a subject and identify consistent findings. This is the task in which many researchers would like to have ERIC's help.

The Clearinghouse

CH directors hold a variety of views on the nature of their primary task, shaped by the perspective of the CH staffs as well as by their special topics of concern. Among their opinions were the beliefs that ERIC should:

1) Publish descriptive reviews covering significant topics in the field. This was the most common focus.

2) Collect all reports useful to CH clients and evaluate their soundness.

3) Provide comprehensive information services to the practitioner through newsletters, journals, query services, and a network of affiliated centers.

4) Identify new issues in the field and commission relevant research papers.

ERIC'S CURRENT PERFORMANCE

Given so wide a range of wishes and expectations, a system with ERIC's limited resources cannot satisfy everyone. The remainder of this section summarizes evidence and judgments concerning how well ERIC currently performs its major tasks. (Appendix A presents a more detailed discussion of the present system.)

Acquisition

Both the breadth and the depth of ERIC's coverage could be tested empirically if there were sufficient interest in this measure of performance. The test might be to select a number of representative topics in which some source other than ERIC (probably a knowledgeable professional) could identify most of the significant fugitive literature, and then compare ERIC's coverage of this literature. None of the experiments we have heard of have found the fraction of ERIC coverage to be very high. These searches may have reflected a bias toward the literature on current practice, in which ERIC is admittedly weak.

ERIC is often criticized for not immediately responding to new areas of interest. Drugs, ecology, and penal education are subjects often cited. At present, it usually takes some explicit direction from Central ERIC to get a CH to cover a new field. The specificity of current domains makes these assignments somewhat arbitrary, and for the CH it often means that less money is available to cover other subjects of more primary interest. Even after the effort is made, a scarcity of fugitive literature on the new subject may still prevent ERIC from providing useful responses. If Central ERIC wants to exert its authority, the current system can be more responsive, but making it so will not necessarily improve the quality of the data base.

It appears that the CHs eventually do acquire something on almost any relevant topic, since they make a conscientious effort to do so. On the other hand, they probably do not cover many topics in sufficient depth to be considered a complete information source by their users, since no feedback procedures are in effect to monitor this quality and little effort is devoted to its pursuit.

One further criterion in evaluating ERIC's acquisition procedures is the system's allocation of effort across major interest areas. At present all CHs are funded at approximately the same level, with internal resource allocation decisions left to each CH director. One could argue that allocations should more accurately reflect the operating objectives of the system. If they did, the budget allocated to each topic might be some function of the amount of R&D being accomplished in that field, the marginal contribution of new knowledge in the field, and USOE's priorities for improvement. The "spread" of the R&D effort could be estimated roughly by ascertaining the recent funding pattern of the major R&D supporters. The value of new knowledge would have to be judged by an objective panel of experts. The demand for literature could be measured at a number of information centers, including the CHs.

The only data we know of reflecting this demand are contained in an analysis of the Information Retrieval Center in Boulder,

Colorado, which shows the distribution of user requests across CH topic areas. Table 3 lists the percentages of requests falling in each CH domain, together with FY 71 CH budgets. Since these data represent the demands in a rural and suburban area, it is unlikely that the distribution of requests is representative of the country as a whole. Nevertheless, if a larger sample continued to show such unequal use of the file areas, it might well argue for reconsideration of the current budget allocation pattern.

Indexing and Abstracting

Although ERIC's indexing and abstracting generally get high marks from librarians and information specialists, they disturb both CH personnel and users. CH staffs complain about the lack of precision with which key words in their field are used by other CHs. Users complain about the profusion of descriptors that may have only tenuous connections with a particular document. The result is that ERIC searches generally retrieve an extremely large number of documents, but they are difficult to screen for relevance, even using the abstracts. Classification of documents by type or intended audience might greatly reduce this problem. Although the thesaurus may be useful in differentiating concepts of concern to educators, it is probably too cumbersome for many routine requests; a simpler level of indexing might improve the usefulness of the data base for many users.

Access

Our observations convince us that most practitioners prefer hard copy and regard the more cumbersome microfiche as a hindrance to access. Hard copy is costly enough, however, given its expected utility, to be beyond the means of all but the most liberally funded researcher; and the delay between ordering and delivery may further reduce the utility of the document.

Access to the literature for most users might be greatly increased if some small subset of the entire ERIC collection were available for loan at a reasonable number of locations.

Table 3

COMPARISON OF CH BUDGETS AND INQUIRIES AT THE BOULDER INFORMATION CENTER

Clearinghouse	FY 71 Budget[a] (in $ thousand)	Percentage of Boulder Requests[b]
Adult & Continuing Ed	150	0.24
Counseling & Guidance	180	8.26
Education Management	210	32.98
Exceptional Children	975	4.15
Education Media & Technology	170	3.54
Modern Languages	175	1.28
Higher Education	155	0.71
Junior Colleges	203	0.30
Library & Information Sciences	180	8.61
Early Childhood	155	1.59
Rural Education	190	0.37
Reading	231	4.96
Science & Math	227	6.92
Teacher Education	197	3.55
Teaching of English	85	3.10
Urban Disadvantaged	202	1.69
Vocational & Technical Education	175	4.92
Social Science	171	7.48
Test Measurement & Evaluation	165	3.54

[a]Includes carryover from previous year.

[b]Based on approximately 3,000 requests received between January 1968-December 1970.

Reviews

We found that most CH directors take their review function seriously, soliciting all of the sources available to them for advice on what topics should be covered, and attempting to get qualified authors to write the review articles. Unfortunately, most users are unaware of this review function, and are usually unable to distinguish such papers from all of the others in the ERIC data base. Also, many of the reviews are descriptions of work recently completed, rather than analytic summaries of research results.

ERIC Products 1969-1970 lists 366 documents classified as: Bibliographies (77); Annotated Bibliographies (94); State-of-the-Art Papers (29); Review Papers (113); and Other (53). In an attempt to categorize ERIC's information analysis output according to more operational objectives, we further divided it as shown in Table 4, for each CH. There are three primary categories: Bibliographies, Research Papers (which are either reviews, state-of-the-art papers, or individual research contributions), and Practitioner Guides, which either help practitioners make program choices or show how to implement a given program. The latter category is further subdivided according to whether the guides were primarily aimed at teachers, administrators, or specialists. The last two CHs on the list, Applied Linguistics and Educational Facilities, have since lost their individual identities.

Table 4 shows a very low rate of practitioner-oriented output at many of the CHs. Some CH directors would be the first to admit they should be doing more, but claim they cannot find out who their potential audience is or what it really wants. When they do produce a special product, they get very little feedback from the grass-roots level as to its actual utility.

Table 4

1969-1970 INFORMATION ANALYSIS PRODUCTS

Clearinghouse	Bibliographies	Research Papers	Practitioner Guides	Teacher	Administrator	Specialist
Adult & Continuing Ed	10	9	1	1	--	--
Counseling & Guidance	4	9	6	--	4	2
Education Administration	11	3	--	--	--	--
Exceptional Children	31	10	12	--	--	12
Education Media & Technology	4	6	1	--	1	--
Modern Languages	4	21	4	3	1	--
Higher Education	1	7	--	--	--	--
Junior Colleges	--	11	6	--	6	--
Library & Information Sciences	3	4	--	--	--	--
Early Childhood	1	4	2	2	--	--
Rural Education	5	7	1	--	1	--
Reading	13	2	--	--	--	--
Science Education	11	9	2	--	2	--
Teacher Education	13	4	11	--	11	--
Teaching of English	28	4	--	--	--	--
Urban Disadvantaged	7	5	2	--	2	--
Vocational & Technical Ed	8	17	5	3	2	--
Social Science	--	--	--	--	--	--
Test & Measurement & Eval	--	--	--	--	--	--
Applied Linguistics	2	6	3	3	--	--
Educational Facilities	15	1	--	--	--	--

III. POTENTIAL SYSTEM OBJECTIVES

To bring coherence to the variegated arguments about the proper functions of ERIC, it seemed useful to draw up a list of potential system objectives to which the arguments could be related in an orderly way. We intentionally extended the scope of this list beyond the boundaries of ERIC to enable consideration of a range of objectives that would be appropriate for a more comprehensive report-based education information system; in this way, decisionmakers can support explicit choices regarding ERIC's role in relation to other institutions and components of the total system.

One could argue that since ERIC is one of many activities sponsored by USOE, whose overall objective is to improve educational practice, it can be judged only by how well it supports this objective. Unfortunately, the improvement of educational practice is too complex a matter for easy measurement. The best we can hope for here is to evaluate ERIC's support of its clients, without knowing exactly how the clients influence educational practice.

Drawing up the list of objectives for ERIC was a crucial step in defining standards against which alternative system models could be evaluated. Although we did not use these objectives explicitly in formulating the models, they helped to focus attention on the problems each model might solve.

For our purposes, system objectives must meet the following three criteria:

1) They must be directly related to the overall USOE objective of improving educational performance, principally by identifying specific people or activities ERIC might serve.

2) They must have clear operational implications, such as the identification of specific products, services, and activities.

3) They must be structured so as to present a set of policy choices for USOE regarding the role of ERIC in relation to other USOE-supported programs and non-ERIC sources of education information.

Deriving the set of system objectives entailed the following sequence of steps:

- Creation of a list of services and products that the educational community might desire to receive from a report-based education information system.

- Formulation of a set of activities necessary to produce these services and products.

- Identification of clusters of products, services, and related activities, with each cluster requiring a common and discrete set of skills, management arrangements, and resources; each cluster of products, services and activities was designated a system function.

- Development of a list of potential user groups, which was then reduced until it included only those distinct user groups who could be expected to place operationally different demands on the system.

- Combination of the lists of system functions and users to produce a set of 10 system objectives, each of which distinguishes some combination of users and functions that requires an identifiable new set of services and products.

USEFUL SERVICES AND PRODUCTS

The identification of useful services and products relied heavily on interviews with many people involved in producing or using the educational information services currently available,* and on observations of the communication process as a whole. The starting point for defining this process was the primary document -- the point at which an author has committed his ideas to print and created an identifiable written product. The end point occurs when someone is able to find it and use it. The communication process (for printed matter only) links these two events; its services and products can be defined as all of the intermediate steps between the two events. (The services and products derived for this study are listed under the system functions to which they are relevant.)

*See Appendix B.

POTENTIAL SYSTEM FUNCTIONS

Seven potential system functions appear to warrant separate consideration, because of the nature of the activities and skills required to support them. They are listed in Table 5 with their associated services and products, in order of increasing ambition and complexity.

The list is sequential in two respects. First, each function requires that the ones preceding it be performed, though not necessarily by the same agency. For example, if USOE wishes to provide or support the personalized services listed under Function V, someone will have to collect, evaluate, and synthesize the literature so that the service agents have something to offer. Second, each function usually implies the availability of skills needed for the preceding ones, since the tasks tend to become increasingly complex as one moves down the list (although there is inevitably a good deal of overlap in practice).

Table 5

CANDIDATE SYSTEM FUNCTIONS

I. PROVIDE ACCESS TO EDUCATIONAL INFORMATION

Required Activities

- Monitor all information sources
- Establish regular input channels and procedures for producers of education information
- Collect:
  - Fugitive research and occasional literature
  - Materials on current practice
  - Commercial literature
  - Curriculum materials
- Screen literature for retention
- Classify and organize literature
- Assign subject descriptors
- Maintain and refine thesaurus
- Index
- Store
- Abstract and summarize research and practice literature
- Coordinate services and products with other agencies, institutions, and major user groups
- Develop and maintain user feedback and product evaluation mechanisms
- Provide services and products to information specialists and linking agents

Table 5 -- continued

Products
- Indexes, guides, thesauri, abstracts, related search tools
- Hard copy
- Microfiche
- Newsletters, bulletins
- Bibliographies
- Abstract collections -- topic- or user-specific

Services
- Rapid provision of hard copy or microfiche to users
- Wide distribution of search tools

II. REVIEW AND EVALUATE EDUCATIONAL INFORMATION

Required Incremental Activities
- Review and evaluate research and practice literature
- Review and evaluate commercial literature and curriculum materials

Additional Products
- Research reviews
- Differentiated and quality-rated data base
- Reviews of current practice
- Reports on research in progress

III. SYNTHESIZE AND SUMMARIZE RESEARCH AND PRACTICE RESULTS

Required Incremental Activities
- Synthesize research and practice results as reported in the literature

Additional Products
- Research synthesis

IV. QUERY RESPONSE

Required Incremental Activities
- Determine user needs
- Prepare and maintain inventory of response materials

Additional Products
- Topical "packages" of selected materials

Additional Services
- Query response: negotiation, transmittal, follow-up
- User-tailored literature searches

V. PROVIDE PERSONALIZED SERVICES

Required Incremental Activities
- Collect nonfugitive research literature
- Market, advertise, and demonstrate system functions and attributes
- Provide services and products directly to final users of information

Table 5 -- continued

Additional Products
Curriculum guides, evaluations

Additional Services
Provision of circulating materials: nonfugitive research literature, commercial and curriculum materials
On-site reference library services
Identification and provision of human resources (specialists, consultants)
Housing and facilities for resident research fellows
Selective dissemination of information
EDP services
Program development consultation for practitioners
Materials/methods development assistance

VI. TRANSLATE RESEARCH AND PRACTICE RESULTS INTO PRACTICAL GUIDES FOR PRACTITIONERS

Required Incremental Activities
Translate research and practice results into program guides
Determine knowledge and information needs

Additional Products
Program implementation guides for practitioners
Occasional papers on selected subjects

VII. ACT AS EDUCATIONAL CHANGE AGENTS

Required Incremental Activities
Identify, construct, elaborate, and verify models and theories of effective educational practice
Determine research requirements and strategies

Additional Services
Training practitioners in information retrieval skills
Evaluations of current practice
Advocacy of new programs and techniques
Training in use of new methods and materials

USER GROUPS

There may be as many ways to classify potential users of ERIC as there are ways to categorize the subject matter. For the present purpose, however, we may distinguish them by information gathering needs and skills, and not strictly by areas of interest.

As a starting point, we can begin with the following six major groups of information users:

Basic researchers -- Mostly at universities, some in profit and nonprofit research organizations. Theoretical orientation; objective is to increase basic knowledge about human behavior.

Applied researchers -- In universities, research organizations, industry, government-sponsored labs and centers. Practical orientation; objective is solution of important immediate problems.

Practitioner specialists -- At the school district or school building level; administrators, testing and guidance specialists, curriculum and subject matter (mathematics, reading) specialists, trainers of personnel, etc.

Practitioner generalists -- teachers.

Decisionmakers -- Legislators, government executives, school board members, government commissions, etc.

Other disseminators -- Communications media, noneducation agencies of government, citizens' groups, unions, etc.

Information specialists are not listed as a separate user class here, since they are not final consumers of information but an integral part of the communication process. Many of the more complex system functions on the list cannot be performed without their help.

Each of the groups listed above would contain information users with diverse skills and interests. What is important for our analysis is that each group is relatively homogeneous with respect to the general character and level of specificity of information that its members will seek. A more highly disaggregated user group description is probably not necessary in order to answer the basic question of interest: What kinds of information (range, areas of interest, level of specificity) should the system collect, process, and disseminate?

In fact, further examination of the list reveals that even this clustering has more specificity than we need for choosing system objectives.

Basic researchers are mostly informed by their "invisible college" of colleagues, and cannot be served to any great extent by an educational information system like ERIC. To the extent that they can use the system, their interests overlap with those of applied researchers. We can therefore collapse these two categories of user groups into one: Researchers.

The distinction between specialist and generalist practitioners is probably overly formal, and largely unrealistic, if we look at the importance of the distinction to actual user information requirements. Presumably, specialists are responsible for most program innovation and implementation, for the introduction of new methods, techniques, and materials, and for special instructional support tasks such as test design and administration, counseling and guidance, or management and administration. Generalists, in turn, are presumably responsible for "final delivery" -- the instructional process. There are two points to be made about this distinction:

1) Increasingly, job titles do not really identify the locus of innovation and change in a school system. Innovative teachers are often responsible for introducing new programs or methods, and they need much the same kinds of information that so-called "specialists" desire.

2) If we look again at the functions, products, and services an educational information system can provide, it becomes clear that from the point of view of the system, the clusters of activities required to support the practitioner specialist and to support the practitioner generalist (where those distinctions are maintained at all) are so much alike that it is meaningless to distinguish them in policy decisions regarding system objectives.

We therefore concluded that these two user groups can also be collapsed into one: Practitioners.

We further concluded that other policymakers and disseminators (such as legislators, the press, public interest groups, etc.) who rely largely on personal sources of information, well-publicized studies, expert advice, legislature hearings, and other "idiosyncratic" information sources, need not be considered separately in this analysis. They do not query an educational information system like ERIC often enough to constitute "target" user groups. When they do query the system, they are most likely to require either highly specific statistical and factual information requiring a special search by an information specialist, or special reviews and syntheses of literature on research and practice. While the system could be built to handle such requests, it would not be an efficient use of resources to create such capabilities to serve users who account for so small a fraction of the demands on the system.

Our preliminary conclusion, then, is that a two-level user-group distinction will serve the purpose quite adequately: Researchers and Practitioners.

SYSTEM OBJECTIVES

Further examination of our candidate system functions, comparing them in this iteration with the needs of our two user groups, yielded the simple matrix of Table 6, taking into account the differences in resources and skills that will be required to meet the needs of different users.

With this refinement, we are able to identify an array of 10 possible ERIC system objectives:

I. PROVIDE ACCESS TO FUGITIVE RESEARCH AND OCCASIONAL LITERATURE.

II. PROVIDE ACCESS TO FUGITIVE RESEARCH AND OCCASIONAL LITERATURE, PRACTICE AND COMMERCIAL LITERATURE, AND CURRICULUM MATERIALS

III. REVIEW AND EVALUATE RESEARCH AND PRACTICE LITERATURE

IV. REVIEW AND EVALUATE RESEARCH AND PRACTICE LITERATURE, COMMERCIAL LITERATURE, AND CURRICULUM MATERIALS

V. SYNTHESIZE AND SUMMARIZE RESEARCH AND PRACTICE LITERATURE

VI. PROVIDE QUERY RESPONSE FOR RESEARCHERS AND PRACTITIONERS

VII. PROVIDE PERSONALIZED SERVICES FOR RESEARCH COMMUNITY

VIII. PROVIDE PERSONALIZED SERVICES FOR PRACTITIONERS

IX. TRANSLATE RESEARCH AND PRACTICE RESULTS INTO PRACTICAL GUIDES FOR PRACTITIONERS

X. ACT AS EDUCATIONAL CHANGE AGENTS

It is assumed that each objective on this list presupposes the accomplishment of all antecedent objectives. Objective 7, for example, implies the accomplishment of Objectives 1 to 6. Technically, this assumption need not hold true in every case; various combinations and permutations become possible with some recasting of the material (and assumptions) presented in this section. Nevertheless, we believe that

Table 6

SYSTEM-LEVEL FUNCTIONS AND USER GROUPS

System-Level Function	User Group	
	Researchers	Practitioners
1. Provide access to educational information	OBJECTIVE #1 Concentrate on fugitive research literature	OBJECTIVE #2 Concentrate on Practice, curriculum, commercial literature
2. Review and evaluate educational information	OBJECTIVE #3 Concentrate on research studies	OBJECTIVE #4 Concentrate on curriculum, commercial materials
3. Synthesize and summarize research and practice results	OBJECTIVE #5 Similar skills required to serve both user groups	
4. Query response for researchers and practitioners	OBJECTIVE #6 Similar skills required to serve both user groups	
5. Provide personalized services	OBJECTIVE #7 Concentrate on research	OBJECTIVE #8 Concentrate on programs
6. Translate research and practice results into practical guides for practitioners	Not applicable[a]	OBJECTIVE #9
7. Act as educational change agents	Not applicable	OBJECTIVE #10

[a]Some will argue that change is as necessary in the style of education research as it is in education practice, yet it is unlikely that changes in research can be initiated through this system. This is more the role of NIE.

as a general rule any system that chooses to meet one of the objectives on this list will soon face client demands that it also meet its somewhat less ambitious antecedent objectives, and it will almost certainly have the manifest capability to do so. As an approach to policy decisionmaking for USOE, then, this "add-on" or step-level approach to the presentation of objectives seems defensible. Table 7 displays this "add-on" assumption in terms of system activities, products, and services.

Table 7

ERIC SYSTEM OBJECTIVES AND ASSOCIATED ACTIVITIES, PRODUCTS, AND SERVICES

Activities, Products, Services	System Objectives									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Monitor all information sources	x	x	x	x	x	x	x	x	x	x
Establish regular input channels and procedures for producers of educational information	x	x	x	x	x	x	x	x	x	x
Collect fugitive research and occasional literature, materials on current practice	x									
Collect commercial literature, curriculum materials		x	x	x	x	x	x	x	x	x
Screen literature for retention	x	x	x	x	x	x	x	x	x	x
Classify and organize literature	x	x	x	x	x	x	x	x	x	x
Assign subject descriptors	x	x	x	x	x	x	x	x	x	x
Maintain and refine thesaurus	x	x	x	x	x	x	x	x	x	x
Index	x	x	x	x	x	x	x	x	x	x
Store	x	x	x	x	x	x	x	x	x	x
Abstract and summarize research and practice literature	x	x	x	x	x	x	x	x	x	x
Coordinate services and products with other agencies and major user groups	x	x	x	x	x	x	x	x	x	x
Develop and maintain user feedback and product evaluation mechanisms	x	x	x	x	x	x	x	x	x	x
Provide services and products to information specialists and linking agents	x	x	x	x	x	x	x	x	x	x
Indexes, guides, thesauri, abstracts, related search tools	x	x	x	x	x	x	x	x	x	x
Hard copy	x	x	x	x	x	x	x	x	x	x
Microfiche	x	x	x	x	x	x	x	x	x	x
Newsletters, bulletins	x	x	x	x	x	x	x	x	x	x
Bibliographies	x	x	x	x	x	x	x	x	x	x
Abstract collections--topic or user specific	x	x	x	x	x	x	x	x	x	x
Rapid provision of hard copy or fiche to users	x	x	x	x	x	x	x	x	x	x
Wide distribution of search tools	x	x	x	x	x	x	x	x	x	x
Review and evaluate research and practice literature			x	x	x	x	x	x	x	x
Research reviews			x	x	x	x	x	x	x	x
Reviews of current practice			x	x	x	x	x	x	x	x
Differentiated, quality-rated data base			x	x	x	x	x	x	x	x
Reports on research in progress			x	x	x	x	x	x	x	x

Review and evaluate commercial literature and curriculum materials	x	x	x	x	x	x	x
Reviews of commercial literature and curriculum materials	x	x	x	x	x	x	x
Synthesize research and practice results as reported in the literature		x	x	x	x	x	x
Research syntheses		x	x	x	x	x	x
Determine user needs			x	x	x	x	x
Prepare and maintain inventory of response materials			x	x	x	x	x
Topical "packages" of selected materials			x	x	x	x	x
Query response--negotiation, transmittal, follow-up			x	x	x	x	x
User-tailored literature searches			x	x	x	x	x
Collect non-fugitive research literature				x	x	x	x
Market, advertise, demonstrate system functions and attributes				x	x	x	x
Provide services and products directly to final users				x	x	x	x
Provision of circulating materials--non-fugitive research literature				x	x	x	x
On-site reference library services				x	x	x	x
Housing and facilities for resident research fellows				x	x	x	x
Selective dissemination of information				x	x	x	x
Provision of circulating commercial and curriculum materials					x		
Curriculum guides, evaluations					x	x	x
Identification and/or provision of human resources					x	x	x
EDP services					x	x	x
Program development consultation for practitioners					x	x	x
Materials/methods development assistance					x	x	x
Translate research and practice into program guides						x	x
Determine knowledge and information needs						x	x
Program implementation guides for practitioners						x	x
Occasional papers on selected subjects						x	x
Identify, construct, elaborate, verify models and theories of effective educational practice							x
Determine research requirements and strategies							x
Train practitioners in information retrieval skills							x
Evaluations of current practice							x
Advocacy of new programs and techniques							x
Training in use of new methods and materials							x

IV. ALTERNATIVE ERIC MODELS

The primary objective of this study has been to develop and analyze a set of structured alternatives to the current ERIC system, with the aim of making ERIC both easier to manage and more responsive to user requirements and emerging issues in the education literature. In considering alternative models, we have focused primarily on:

- o The number of clearinghouses
- o The domain of each CH
- o The level of service provided by each CH
- o The internal and external system linkages

Putting together all possible combinations of these parameters would generate a profusion of mostly nonsensical designs. The approach here has been to develop a sequence of models, each incorporating some changes suggested by our observations of current practices. Table 8 summarizes the models.

After examining the communications needs and styles of educational practitioners, the problems of managing a network of 19 clearinghouses, and the fractionated and overlapping charters of the CH system, we have concluded that many significant improvements in ERIC responsiveness could be achieved by reducing the number of CHs in the system, thereby increasing the funds available for those remaining.

Practitioners, for example, require greater information synthesis and translation efforts, together with a more systematic treatment of their problems, than is possible within the funding and network limitations of the present system. Similarly, ERIC cannot become appreciably more responsive to new and emerging issues without allocating increased resources to activities aimed at anticipating the needs of the education community. This, too, is prohibitively difficult within existing funding limits and, just as importantly, within the framework of fractionated and overlapping subject interests that characterize the present network. Consequently, the models of alternative networks to be presented in the following pages focus primarily on systems with fewer CHs.

Table 8

MODEL SUMMARY

Model	Number of CHs	Domain	Services	Linkages
Procedural Change	19	Present	More Targeted Products	Greater Input from CH Directors in Policy Decisions
Divisional	19	Present	Consistent Within Divisions	Much Greater Coordination Within Division
Consolidated	8	Consolidation of Present Domains	More Synthesis	Present
Functional	7	User Groups	More Synthesis. Tailored to Audience for Each CH	Present
Centralized	6	Core Plus Special Areas	Tailored for Few High Priority Areas	More Standardized
Regional	8+	User Groups and Regions	All Required for Complete Communication Process	Direct Ties Between Information Centers and CHs

In reducing the number of CHs, we suggest three alternative ways to define their domains. The Consolidated and Centralized Models involve different consolidations of the current network; the Functional Model is an attempt to devise a more useful partition of the subject matter than is currently provided. The Regional Model maintains subject matter responsibilities at the national level, but adds regionally based CHs oriented to user services.

In our Consolidated, Functional, and Centralized Models we discuss some variations in service levels for each specific CH audience. For each model we discuss changes in the system linkage that appear necessary to keep it responsive.

Clearly, the operational problems of transforming and, in particular, reducing the present ERIC network may be quite numerous. The more obvious problems are how to retain expert ERIC personnel, maintain the professional contacts essential for literature acquisition, and minimize user confusion during transition. Another problem is that any significant changes are bound to arouse some degree of political resistance. In designing the network models described below, we have attempted to take these problems into account.

If the present network is to be significantly altered, it would help a great deal if one could draw on ready-made taxonomies or categorizations of educational activity and use them to define charters for the CHs in alternative networks. Unfortunately, neither diligent search nor extensive interviews have uncovered any such simplifying taxonomy. Moreover, even the distinctions between any two categorizations of educational activity are frequently arbitrary. Consequently, the networks described below were developed from such "first principles" as we could define for the ERIC system's role in acquiring, processing and disseminating educational information, and are clearly not sensitive to minor variations. Section V will describe a method for evaluating the candidate network models.

Current ERIC

The baseline for evaluating any new model is the current ERIC system, whose distinguishing characteristics as an information system are:

1) Each of the 19 CHs in its decentralized network is sponsored by a private organization under contract to USOE, and specializes in a particular domain of education literature.

2) Each CH performs (with varying emphasis) the services of acquisition, selection, indexing and abstracting, and production of information analysis products.

3) All users are served through a common set of index publications.

4) Users are discouraged from direct contacts with the CHs; instead, they are directed to intermediate information centers or libraries having no formal direct links with ERIC except through its publications.

5) After using ERIC search tools, users purchase microfiche or hard copy reproductions of documents from an independent contractor.

Procedural Change Model

All of our subsequent models involve substantial changes in the CH network. Before turning to these, however, we can consider a variety of changes in the current system that might improve its responsiveness:

1) More aggressive pursuit of practice literature. All of the practitioner resource centers that we visited cited a shortage of documents describing programs in current practice. Many of them felt the need to supplement the ERIC data base with their own locally generated literature.

2) Greater differentiation of data base. Another common complaint about the current system is that it is difficult for users to identify documents they will find useful without laboriously reading through stacks of abstracts and even the documents themselves. Much of this effort could be eliminated, and the precision of information retrieval improved, by differentiating the ERIC data base along lines that reflect the interests, abilities, and background of various ERIC user groups. Differentiations by type of document (e.g., report of research, evaluation of research, description of program, exposition of ideas), by intended audience (researcher, teacher, administrator, information specialist), by historical or current value, or by educational discipline (English, Mathematics, Art) could all minimize the present difficulty of literature searches.

If this more evaluative approach to indexing and abstracting costs more than the current approach, resources could be concentrated on the more significant documents by employing a two-level system of categorizing:

Level 1: Completely indexed, and identified as to purpose, audience, etc.

Level 2: Indexed with only one term, and not referenced in any but the most extensive searches or bibliographies.

Although -- and perhaps because -- ERIC employs a highly sophisticated thesaurus and indexing scheme, the search tools available to users still seem overly cumbersome. Some of the more active information centers have found it helpful to publish a simplified set of indexes or catalogs that make it easy to specify requested information on the more routine topics.

3) Improved intra-ERIC communications. Our interviews with CH, contractor, and Central ERIC personnel indicated a virtually universal desire for closer working relationships among ERIC system components. For example, the ERIC Facility Contractor would like to help CHs develop uniform standards for abstracting and indexing, and the CHs would like a greater voice in establishing lexicographic standards and guidelines for maintenance of the ERIC thesaurus. It seems likely that these and other forms of intra-ERIC cooperation could be inexpensively achieved by holding periodic working sessions for the appropriate CH, contractor, and Central ERIC specialists. Other sessions might be held to permit CH directors to exchange ideas and experiences in acquisition programs, management, and information analysis activities. Such exchanges would be of particular benefit to new directors who, it now appears, profit little from the past experience of others.

4) Systematization of CH activities. Much of the variability in CH services and products can be traced to the different needs of individual constituencies, but some of it results from the different philosophies and attitudes of CH directors toward user needs. Consequently, those intermediate users who deal with more than one CH (e.g., library reference staffs), may find that services or information products available at one CH are unavailable in comparable form at

another CH. One result is user frustration and dissatisfaction, much of which could be eliminated by establishing more uniform and systematic coordination of the kinds of services and information products offered by each CH.

Divisional Model

The present network of 19 CHs has several alleged drawbacks. Among these, critics cite gaps in its coverage, slowness in responding to new issues in education, and unwieldy management communication, which are a direct result of the overspecialization and proliferation of CH charters. The simplest approach to solving these problems would be the creation of ERIC Divisions, like those in Fig. 1. Each Division would consist of a

INSTRUCTION	CAREER EDUCATION	ADMINISTRATION[a]
Reading	Vocational Education	Higher Education[b]
Social Science	Adult & Continuing	Junior Colleges
English	Counseling & Guidance	Educational Management
Foreign Language		Teacher Education
Science Education		

SPECIAL EDUCATION	"INDEPENDENTS"
Urban Disadvantaged	Library & Inf. Science[c]
Rural Education	Test & Evaluation[c]
Early Childhood	Media & Technology[c]
	Exceptional Children[d]

[a]The placement of the Higher Education, Junior Colleges, and Teacher Education CHs under an Administration Division reflects the fact that these three CHs primarily handle literature dealing with problems of administration in each of these areas.

[b]Alternatively, might be considered under Career Education Division.

[c]Alternatively, might be considered under Administration Division.

[d]Alternatively, might be considered under Special Education Division.

Fig. 1 -- Example of a Divisional Model

number of ERIC CHs overseen by a divisional staff, which would in turn be monitored and directed by the staff of Central ERIC. The Division staff, consisting of perhaps three professionals, would monitor and direct CH activities across the entire domain of the Division. They would constantly review the literature coverage of their division, detecting gaps and assigning new topics to CHs they judged appropriate. This process would avoid the indecision, duplication of effort, and topic competition that presently contribute to network coverage problems.

The Division staff would also monitor, coordinate, and systematize, with the approval and direction of Central ERIC, the activities of each CH within the Division. The present network largely precludes this kind of closer management because of the difficulties inherent in attempting to monitor and coordinate directly the activities of 19 different organizations. Closer management would enable each Division staff to submit periodic recommendations, with detailed supporting arguments, concerning such divisional functions as:

- The number of CHs in the Division, and the literature domain of each CH;
- Allocation of divisional budgets among CHs in that Division;
- Definition of user requirements and "standards of service" for each CH in the Division;
- Planning, coordination, and systematization of all information analysis activities within the Division.

In Fig. 1 the 19 present CHs have been structured beneath divisional charters selected to reflect the user needs and styles of communication characteristic of major ERIC constituencies. Although the CHs in each division could change in number, charter, interest, or location, the Division itself would become a long-term building block of the ERIC system. Specialist CHs (the "Independents") could be allowed to come and go as interests shifted across problem areas, and as external sources of funding increased or decreased.

Consolidated Model

Discussions with CH personnel and an analysis of CH products confirm that there are many arguments for reducing the number of CHs. Doing so would simplify the management tasks of Central ERIC and the problems of coordination and communication within the ERIC network. In addition, the broader scope of the remaining CHs could offer more useful syntheses and analyses of the acquired data base. Since each of the remaining CHs would be larger and would represent a greater fraction of the entire system, the CH Directors would have greater motivation and opportunity to improve the total ERIC system. The Consolidated Model (see Fig. 2) is an attempt to reduce the number of CHs

CONSOLIDATED CHs	PRESENT CHs
Communication Skills	English, Reading, Modern Languages
Arts & Sciences	Science & Math, Social Science
Career Education	Adult Ed, Vocational Ed
Special Education	Urban Disadvantaged, Early Childhood, Rural Education, Exceptional Children
Education & Information Technologies	Library & Info Sciences, Media & Technology
Higher Education	Higher Ed, Junior Colleges, Teacher Ed
Management, Evaluation, & Guidance	Management, Test & Evaluation, Counseling & Guidance
New Concepts	--

Fig. 2 -- Example of a Consolidated Model

in a straightforward way by combining the existing domains. This approach simplifies potential transition problems, for the consolidations can be phased over time and there is a simple and direct relationship between the old and the new CHs.

One problem faced by the Consolidated Model (or any other in which CHs have greatly expanded scope) is that it will be hard to place all

of the skills required to cover the field under one roof. However, it may not be necessary for all the employees of a CH to work in the same place; it would seem feasible to employ specialists throughout the country to cover topics within a CH domain. Under this arrangement it would also be possible for some of the staff in existing CHs to participate in new CHs created through consolidation.

The following changes are reflected in Fig. 2:

1. Combine the English, Reading, and Modern Languages CHs into a Communication Skills CH. There is considerable overlap in the core concepts of each of these topics, and distinctions between them are less significant than those between most other subject areas.

2. Combine Science & Math and Social Sciences into an Arts and Sciences CH that would cover all curricular areas not included in Communication Skills. While curricula reform in all of these areas is well advanced, there is still considerable concern with the interrelationship of these subjects and the attention to be devoted to each one.

3. Combine Vocational, Adult & Continuing Education, and the relevant parts of Junior Colleges and Guidance & Counseling into a Career Education CH. The relevant parts of the Junior College CH domain are those dealing with vocational or community programs, and of the Counseling & Guidance CH those activities affecting career choices. The new CH should attempt to bridge distinctions now made on the basis of age or place of learning in student bodies with common interests in enhancing particular skills.

4. Combine Disadvantaged, Early Childhood, Rural, and Exceptional Children into a Special Education CH, primarily concerned with special education problems caused by the physical, emotional, and cultural background of the student. Early Childhood is included in this list because of its clear overlap with the concerns of the disadvantaged.

5. Combine the Library & Information Sciences and Media & Technology CHs into an Education and Information & Technologies CH, whose primary focus would be on systems and hardware that support the learning process.

6. Combine Higher Ed with parts of the Junior College and Teacher Ed CHs to form a single Higher Education CH concerned with all types of

higher education programs. Substantive aspects of teacher education should be covered by the other CHs in their relevant areas.

7. Combine Management, Test & Evaluation, and the remainder of Counseling & Guidance into a single Management, Evaluation, and Guidance CH concerned with the planning, management, support, and evaluation of instructional programs and student achievement.

8. Create a New Concepts CH to deal with emerging topics that overlap the domains of several CHs and show no clear indication that they will remain of long-term interest to educators. Environmental education, vouchers, and performance contracting might be candidates for this type of coverage. When a topic becomes clearly defined and a continuing interest established, coverage should then be transferred to one of the other CHs.

By its nature, this CH will deal with literature of more uneven quality than the others, relying more heavily on the news media and commissioned papers by the leading personalities in the field. We assume that the total funding level as well as the basic CH operating procedures would remain unchanged. Greater efforts could be devoted to the evaluation and synthesis of information, and the CH staffs would be able to integrate all the topics for which their CH is responsible.

Functional Model

The motivation and rationale for the Functional Model are essentially the same as for the Consolidated Model. The difference is that here we relax the requirement to start with the existing CH network, and create in its place a somewhat different taxonomy of CH domains.

The existing CH domains appear to have been generated by a variety of concerns. Some focus on subject matter (English, Science & Math), others on special student groups (Early Childhood, Disadvantaged), still others on institutions (Higher Ed, Junior Colleges). Finally, some are concerned with functions common throughout education (Management, Testing & Evaluation). Almost any interesting problem is liable to lie at the intersection of at least two of these CH domains. The problems of the disadvantaged inevitably include problems of reading,

testing, and counseling. The problems of higher education can involve management and technology. In the early stages of this project, it was hoped that some of this duplication of concerns could be eliminated by a more consistent taxonomy that would define the data base on a clear problem-oriented basis. After extensive inquiry and thought, we no longer believe this to be possible. Everyone has his own way of describing the important topics within the field. For this reason, our approach to reducing the overlap between CHs has been to reduce their total number while making the literature domain partitions between them as clean as possible.

Figure 3 is an example of a Functional Model. We have described it in terms of a divisional structure, for clarity, although it is not obvious that there is a requirement for any divisional activities. It distinguishes two primary categories of information -- those dealing with classroom instruction and instructional support.

Instruction	Instructional Support
General Education	Management & Administration
Special Education	Technology
Exceptional Children	Evaluation
Career Education	

Fig. 3 -- Example of a Functional Model

The Instruction Division would consist of four CHs covering the problem areas listed at the left of Fig. 3. Each CH would focus primarily on fundamental relationships among students, teachers, the instructional setting, and the educational system. Curriculum, planning, instructional methods, behavior problems, and individual learning, evaluation, and guidance should all be covered.

The audience for this material would include product and program developers, other applied researchers, teachers, planners, and specialist consultants. We would expect this to be the primary area within the ERIC data base in which users' queries will continue to require extensive search and screening of a large number of references,

since there are so many unique combinations of subject matter, instructional method, and student characteristics. This is also the material that would be of primary interest to Teacher Renewal Centers when they are developed.by USOE.

The primary focus of the three CHs in the Instructional Support Division would be information relevant to decisions affecting management or support of operational programs. Unlike the topics in the Instructional Division, the topics covered by these CHs would be relevant not only to education but to many other fields. In fact, many of the techniques in use today were developed initially for other purposes and later adapted to educational needs. Since much of this development takes place outside of or on the periphery of the education community, it would be unrealistic to expect ERIC to play a central role in interdisciplinary communication among researchers.

Since the topic concerns of this Division would probably be of long-term interest to decisionmakers, a tailored set of newsletters, or an SDI mechanism that can keep them informed of recent developments in their areas, becomes much more feasible. This service might be provided by commercial contractors using the ERIC data base as their source. Finally, we would argue that the Technology and Evaluation CHs should restrict themselves primarily to system-wide aspects of these topics, and leave their classroom use to the appropriate instructional CH.

Centralized Model

The motivation behind a Centralized Model is the desire to increase the system's efficiency in covering those domains that are relatively stable and of general interest by utilizing a single Core CH, and establishing small specialized CHs only when there is a large body of coherent research in progress or there is a uniquely defined clientele to be served. An example is shown in Fig. 4.

The establishment of a Core CH should simplify collection of the more visible research reports and reduce the cost of document processing. It would also insure balanced coverage of the entire education

CORE CH

Urban Disadvantaged CH
Exceptional Children CH
Career Education CH
Higher Education CH
Library & Information Sciences CH

Fig. 4 -- Centralized Model

field, since resource allocation across topic areas would be an internal decision. The specialized CHs would be free to concentrate primarily on the significant research and practice literature and produce documents that meet the needs of their special audience.

Regional Model

The Regional Model is designed to use ERIC resources as the basis for a broadly coordinated effort to bring more direct and more comprehensive information services to the education practitioner. The aim is to improve the system's ability to identify and collect locally generated fugitive literature, especially in the area of local practice, and to improve intrasystem communication and system responsiveness to user needs.

One of the most serious problems with the current ERIC system is its inability to be highly responsive to the needs of education practitioners. To some extent, this problem can be ameliorated by restructuring ERIC in order to insure more effective management of system functions and more complete coverage of the important literature, especially in new areas. We have described above a number of system models designed to accomplish these objectives. For the most part, however, the practitioner responsiveness problem is rooted in the nature of the present system: the CH concentration on "archival" objectives (collection, indexing, abstracting); the CH focus on educational subject areas rather than on specific client sets (except as client sets and subject areas tend to be coterminous, as with associations of

teachers of specific subjects such as social science in which CHs specialize); the physical remoteness of most CHs from practitioners; and the staffing and resources available to CHs, which preclude most user service activities. None of the models described above will fully correct these impediments to better service for practitioners.

Out of concern for the needs of practitioners, and in recognition of these problems, USOE has recently begun to fund a series of Information Resource Centers, is encouraging similar ventures funded with state or local monies, and has initiated plans for Teacher Renewal Centers. In addition, one part of the current ERIC system is a noteworthy exception to the description of system deficiencies in practitioner service: the Exceptional Children/Instructional Materials Center network. The Regional Model is patterned after the CEC/IMC system, which in our judgment has been reasonably successful in responding to the practical needs of educators for specific information.* The model is designed to capitalize on existing and planned Information Resource Centers that are in danger of being underused or misused, and to incorporate planned Teacher Centers as an integral part of the system. In addition, the model incorporates some structural features suggested by some of the other models described in this section, for reasons explained in detail below. Figure 5 is an example of the Regional Model. Its principal features are as follows:

1. Six national level clearinghouses, each oriented to the problem focus of specific user groups:
    a. General Education
    b. Special Education
    c. Exceptional Children
    d. Career Education
    e. Instructional Support
    f. Higher Education

*The relative success of the CEC/IMC network is due in part to the fact that it deals with a more sophisticated literature and more limited and clearly defined client groups than do other CHs. These are special conditions that would not be duplicated by other networks in the Re-

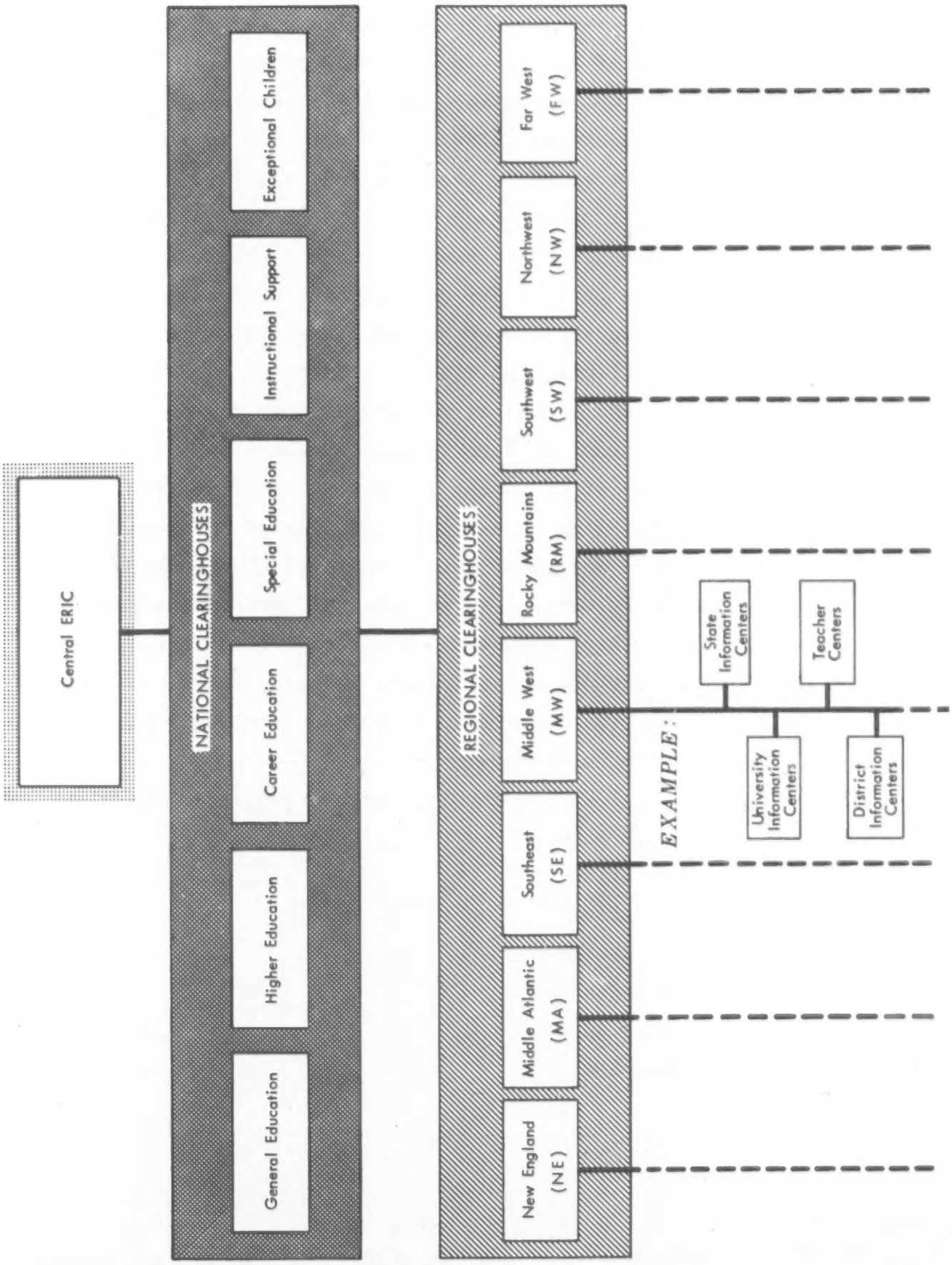

Fig. 5 -- Example of a Regional Model

This aggregation generally follows the logic of the Functional Model, discussed previously. The user client groups are self-explanatory, and for the most part nonredundant. In this model, the Instructional Support CH would be responsible for subject areas assigned to three individual CHs in the Functional Model: Management and Administration, Technology, and Guidance. These CHs would have the same tasks generally assigned to CHs in previous models (and depending upon OE's choice of system objectives): acquisition, indexing, abstracting, preparation of information-analysis (IA) products, and so on.

2. A series of regional clearinghouses, each capable of direct service to both practitioners and researchers in its geographic area. These CHs would have direct communication links with each of the national level CHs, and would be able to draw on the staff resources at those levels as needed, as well as on a common data base. The regional CHs would (themselves and through associated Information Centers: see below) also collect practitioner-generated literature on a local level, classify it, and send it on to the appropriate national level CH for inclusion in the common data base, thereby improving the acquisition capability of the system, especially in hard-to-locate literature on current practice. The regional CHs would provide more complex and more ambitious services to users than could easily be provided by national level CHs (under any system described in this section), with precise objectives to be determined by USOE but with a capability to perform (to some extent) all objectives on the list presented above in Sec. III. Because the regional CHs would be in more direct contact with local users, they could adjust their information holdings, services, and staff skills and levels in accordance with user needs; they could provide invaluable user feedback information to the national level CHs and Central ERIC; and they would be in the best position to provide selected services and assistance to associated Information Centers on the local level. They could maintain selected collections of journals, books, and curriculum materials; provide access to the ERIC data base, other fugitive material, and information resources of the professional associations; and prepare regionally targeted information analysis products. They could provide search services and related assistance to local Information

Centers (see below) or directly to users, through the use of trained information specialists, and they could train local linking agents and interested practitioners in the skills required to use their services most effectively. Existing and planned Information Resource Centers (e.g., at Boulder and San Mateo) already perform many of these functions; the CEC/IMC network is a virtually complete example already in operation, albeit for a special clientele. The critical difference between this model, with its new designation for existing resources, and the present division of these responsibilities, is that IRCs and ERIC do not now have the system linkages necessary to maximize IRC utility to the user. (CEC/IMCs are again an exception, but the IMCs restrict their subject/client focus to special education, whereas the regional CHs in this model would have a broader focus, as typified by the existing IRCs.) ERIC has no management authority in the IRCs at present; nor do the IRCs share their locally acquired information or locally generated IA products with the ERIC system or with other IRCs. The potential national benefits of a fully coordinated information system are thereby foregone.

3. Local Information Centers/Teacher Centers, each associated with a regional ERIC CH. These centers would be more personalized and less ambitious efforts than what we now know as Information Resource Centers (IRCs); they would more closely approximate the satellite IMCs now associated with regional IMCs. They would be located in each district; large districts might have several such centers. In large urban districts, a Regional CH might itself be located as a direct service agency to a cluster of teacher centers; if it were located elsewhere, the local information functions of the small Information Centers could be incorporated directly into the Teacher Centers, where direct contact with users would be maximized. Since Teacher Centers are unlikely to completely fill the need for local information sources of this kind, small Information Centers at the local level also seem appropriate. Many of these operations could be staffed by one person in a school district office; they should be locally (or state) funded (as satellite IMCs now are, in part with Federal discretionary monies), and should attempt to deal with the majority of day-to-day user questions. In

addition, they would negotiate user requests and deal directly with their regional CH, as linking agents between practitioners and information sources. Finally, they would be responsible for collecting information on local practice, and other locally generated educational information, and for transmitting what they collect to their Regional CH for screening and possible inclusion in the national data base.

This model maintains most of the managerial and organizational advantages of the Functional or Consolidated Models (an organizational option at the national CH level might be the centralized model), and would improve the ability of the system to capture locally generated materials. The model would introduce planned system-wide coordination and communication, would be capable of much greater responsiveness to the direct and immediate needs of practitioner users, and would make the system more accessible to the research community as well. Finally, the model could be built upon present and planned information system resources in an ordered manner. The consolidated national level CHs could be established within present budget constraints; regional CHs could be supported with funds now used or planned for Information Resource Centers of the Boulder variety; Teacher Centers could be integrated into the system as they were independently funded and created; local Information Centers could be established with Federal encouragement and possibly seed money, and funded by states, counties, or districts.

The basic rationale behind this model could be restated as follows: ERIC need not attempt to fund and manage a vast national educational information network that extends down to the local level, but ERIC, as the most visible and experienced component of such a system, and as a critical arm of the Federal role in education information dissemination, could take the lead in planning and executing a highly coordinated structure of this kind; could fund and manage key parts of that structure; and could insure the compatibility of the ERIC system per se with other existing and planned information (and related practitioner assistance) efforts throughout the country.

V. CHOOSING A MODEL

The last two sections discussed a sequence of objectives that can be used to focus ERIC's direction, and a number of models designed to emphasize various desirable characteristics. This final section addresses the question of how the USOE should proceed in selecting a future course of action.

COMPARING THE MODELS AGAINST EACH OBJECTIVE

Each objective places its own peculiar demands on the system, and it is very unlikely that any one model can fulfill all of the objectives more effectively than can any other model. In this section we attempt to quantify and explain our judgments on the relative effectiveness of each model in meeting each of the objectives. We then examine how various preferences among objectives influence these initial judgments.

Selecting the "best" model entails a variety of judgments that only USOE can make, in light of the objectives they wish to pursue and the degree of political and managerial turmoil they are willing to endure to reach them. It also involves some technical judgments that are best left to people familiar with the current system. These judgments have to do with processing and communication efficiencies, the skills and interest of staff the system is likely to attract, and the kinds of relationships the CHs are likely to develop with other organizations. To make these comparisons, involving six organizational models and ten potential system objectives, we suggest the use of formal scaling techniques.

Our approach can best be explained by reference to the Comparison Matrix in Fig. 6. The potential system objectives are listed in the first column. The entries in each row represent the consensus of the Rand study team members on the relative effectiveness of each model in performing that specific objective. The reader of course may arrive at different judgments. The way to generate these entries is as follows:

- For each row in the matrix, decide which model will best meet the corresponding objective. Assign it a score of 100 for that row.

Objective	Model A ERIC Today	B Procedural Change	C Divisional	D Consolidated	E Functional	F Centralized	G Regional
1. Access to Research Literature	80	90	90	100	100	100	90
2. Access to Research Practice, Commercial, Curriculum Literature	30	50	60	70	70	60	100
3. Review and Evaluate Research and Practice Literature	20	40	50	95	100	90	80
4. Review and Evaluate Research and Practice, Commercial and Curriculum Literature	10	20	70	80	80	60	100
5. Synthesize and Summarize Research and Practice Literature	50	50	60	95	100	70	70
6. Query Response, Researchers and Practitioners	30	30	60	70	80	70	100
7. Personalized Service for Researchers	50	50	60	100	90	90	70
8. Personalized Serviee for Praccitioners	20	20	40	60	70	60	100
9. Translate Research and Practice into Practical Guides for Practitioners	40	50	80	90	100	80	80
10. Change Agents	20	30	30	50	50	50	100

Fig. 6 -- ERIC Model Comparison Matrix

- To each other model in the row, assign a score from 0 to 100 indicating the model's expected performance in comparison with the "best." Continue until all boxes in the matrix are filled.

Once we have determined the relative priority of each objective, we can use these numbers to obtain a total score for each model.

Formal scaling techniques are particularly useful when decisions must be highly judgmental. In this case, choices are informed by the

findings of this study, by other knowledge, and by personal experience, but there is no body of empirical data or set of operational theories to support more objective decisions. The virtue of the scaling approach is that it makes the exercise of judgment a formal and explicit process.

The following paragraphs summarize the rationale behind the Rand study team's judgments shown in Fig. 6.

1. Provide access to fugitive research and occasional literature. This is ERIC's primary objective today. We believe there would be little difference among models in meeting this objective, since many of the activities are highly routinized. The slightly higher scores for models D, E, and F are attributed to the smaller size of their networks and an assumed improved management capability for the bibliographic search tools.

One theory holds that maintaining a large number of CHs improves the system's ability to acquire good documents, since this leads to more direct links with the research community. Having visited each of the CHs, however, we find little support for this theory. Successful acquisition programs appear to result from a thorough search and follow-up by the staff, rather than from the director's personal contacts.

2. Provide access to fugitive research and occasional literature, practice and commercial literature, and curriculum materials. Model G scores significantly higher because of its regional and local connections--since most of the practice literature is produced at the school district level--and its ability to improve the practitioner's physical access to the material. If ERIC and the Information Centers remain two separate entities, we believe the performance of these tasks will be seriously degraded. Of the remaining models, D and E are best because their CH orientations are more user-focused. The current system gets such a low score because of its inability to communicate with the practitioner to determine his needs, and the lack of a user focus within many of the current CHs.

3. Review and evaluate research and practice literature. Models D, E, and F should perform the best, since their CH domains are defined on a broader, more problem-oriented basis. We would expect this function to suffer somewhat in model G since it is not the first priority of business.

4. Review and evaluate research and practice literature, commercial literature, and curriculum materials. Since the fulfillment of this objective requires an understanding of the practitioner's needs, the Regional model was assigned the highest score. Models D and E also score high because of the problem focus of the domains and the improved ability of the larger CHs to study the practitioner's needs.

5. Synthesize and summarize research and practice literature. As in Objective 3, we would expect the expanded focus on the CHs in Models E and F to encourage the broadest synthesis and summarization. In Model G this objective might receive less attention. In the models that retain the current 19 CHs, useful synthesis almost always involves several CH domains and will therefore be difficult to achieve.

6. Query response for researchers and practitioners. Here again, the Regional Model should outperform the others because of its direct connections to Information Centers and Teacher Centers. Models D, E, and F should perform about the same, with E doing slightly better because of its clearer focus on the user.

7. Provide personalized services for research community. This is one of the hardest to judge. If one believes that CH identification with the research community leads to better service, while too much proliferation of small CHs leads to losses in economy, then the Consolidated Model should be the best.

8. Provide personalized services for practitioners. Model G would meet this objective significantly better than any of the others, since it is in more direct contact with the user through the Information Centers and Teacher Centers.

9. Translate research and practice results into practical guides for practitioners. Here, the Functional Model with its more problematic focus would do the best job of converting R&D findings into useful practitioner guides. The Consolidated Model would be almost as good.

10. Act as educational change agents. The Regional Model excels others in encouraging change. It has a superior ability to go out and find potential users and draw them into the system.

WEIGHING OBJECTIVES

As our Comparison Matrix shows, the desirability of the models is affected by the priority to be assigned each objective. Choices among objectives will be informed by multiple criteria:

o Need -- the extent to which desirable objectives in a national education information system should be met by ERIC, or are now met elsewhere, will be met elsewhere under plans now being considered, or could best be met by other existing or planned organizations.

o Technical feasibility -- the availability of required talent, organizational strength, and management skills.

o Political feasibility -- the views and desires of system clients, organizational constituents, and potential user groups; the roles of other government agencies and of private organizations dealing with educational information; Federal Government priorities and available resources.

Tentative conclusions about the models' performance will become part of a reevaluation of objectives; further iterations in this cycle are undertaken as necessary in order to refine judgments. The relationship of models to objectives is particularly crucial when objectives are weighed for technical feasibility, since the model chosen will strongly determine the availability of the organizational strength and management skills required to accomplish any given objective.

Preferences among objectives should be expressed in comparative form, the most convenient approach being a numerical ranking. When these preferences have been refined through the initial iterations described above, we will want to see how the resulting rank-ordering of objectives affects our choice of system models, which were first compared against objectives under the temporary assumption that all objectives were of equal value.

Following a discussion of the findings of this study, the NCEC staff completed their own ranking of potential objectives in the following manner (see Table 9):

o The most important objective was assigned a weight of 100.

o Other objectives were assigned a weight between 0 and 100, indicating their importance relative to the "most important" objective.

We used these weights to obtain a weighted score for each model. We proceeded as follows, using the Comparison Matrix (Fig. 6):

- o We multiplied the scores in each row by the objective weight.
- o We summed the resulting products in each column to get the total weighted score for each model.

Table 10 lists the weighted scores for each model, obtained by following the procedure above and using the Rand model scores and the NCEC objective weights. They show very little differences among the

Table 9

NCEC OBJECTIVE WEIGHTS

Objective	Weight
1	100
2	100
3	95
4	85
5	75
6	25
7	15
8	10
9	10
10	0

Table 10

MODEL WEIGHTED SCORES

Model	Weighted Score
ERIC Today	211
Procedural Change	274.5
Divisional	363
Consolidated	472.25
Functional	493.5
Centralized	424
Regional	507

Consolidated, Functional, and Regional Models, but significant differences between these and the others. The Regional Model scored higher on all the practitioner-oriented objectives; the Consolidated and Functional Models scored higher on the researcher-oriented objectives.

If the objective weightings and model scores are accurate, the weighted scores indicate that the choice among the Functional, Consolidated, and Regional Models can be made on grounds other than technical efficiency.

ADDITIONAL EVALUATION CRITERIA

The first approximation of the relative attractiveness of each model is based on a weighted comparison of models against objectives. We recommend that successive approximations introduce three additional criteria in the rank ordering of organizational models:

o Management effectiveness -- the extent to which a model facilitates system-wide communication, coordination, and direction; the extent to which it may be managed without undue expenditure of resources on pure management functions; the extent to which it appears feasible to apply objective criteria in evaluating the performance of system components.

o Flexibility -- the system's ability to contract or expand its services in response to user needs; the ability to meet new and more ambitious information system objectives if required to do so.

o Ease of transition -- the political, economic, and organizational costs of moving to a new organizational structure.

It is important to apply these additional criteria to the choice of system models for at least the following reasons:

o System models and potential objectives are of necessity described at a level of abstraction that renders the choice of models insensitive to modest differences in judgments and preferences. The scaling technique suggested is not refined enough to overcome this problem. Therefore, models receiving reasonably similar total scores can be considered to perform with no important difference against objectives, and should be evaluated on other grounds.

o There are serious knowledge uncertainties; the application of multiple criteria is further insurance against the consequences of these deficiencies.

o Federal planning in this area is not yet firm. Many of the proposed activities of the NIE are still being debated, and will emerge only as the NIE grows in the context of real-world pressures. USOE's teacher renewal strategy is still being refined and will take some time to implement; additional Federal and state initiatives are likely over the next few years. When the future is uncertain, as usual, system flexibility becomes an important criterion.

o If the transition to a new organizational structure seriously disrupts services to existing clients, causes an unanticipated strain on financial resources needed for system support, or creates important political enemies, the effectiveness of an otherwise attractive organizational model may become seriously impaired.

Management and Flexibility

We would expect the Functional Model to weather the strains of shifting priorities and user interests most easily. It should be less vulnerable to arguments for establishing new domains and also lead to clearer choices about new subject responsibilities.

The Regional Model has a different kind of flexibility. Since many functions are replicated in each region, it offers the opportunity for experimentation and comparisons between activities, and the implementation of exemplary practices across the entire system. It also offers a more systematic way to encourage and sustain the diverse set of information centers needed to support the users.

There can be no doubt that the models comprising smaller numbers of CHs will be easier to manage. Communications will be easier. Coordination of products and coverage will be simpler. And Central ERIC will have more time for evaluating the work of each CH.

Transition Problems

The alternative models were introduced in order of increasing change to the present structure. The first two, the Procedural Change and Divisional Models, would not raise any large problems in transition, since the existing CHs are retained. The only real problem would be the planning involved to bring them about.

All of the subsequent models would raise considerable problems because of changes in the network structure. Over the past years, ERIC has encouraged the CH directors to form close links with related associations. Many of these associations now harbor a proprietary feeling toward "their" clearinghouses. Besides providing advice or political support, there is often a direct contribution of services. Some associations provide space in their journals or newsletters for CH announcements or articles. Others subsidize the printing and distribution of CH I/A products.

There is no reason why these relationships cannot continue with the new models. Since each CH will have a broader scope, any one association may have a less exclusive demand on the attentions of the CH staff, yet the mutual benefits derived from association advice and dissemination of materials pertinent to their membership should still prevail.

Many users now limit their attention to the input of one or two particular CHs. They do so by scanning the abstracts under the CH of interest in each monthly issue of RIE. Any of the new models will make it more difficult to screen documents in this simple way since the inputs of a single CH will be much larger than today. However, a similar feature could be provided under any of the proposed models by having each CH divide its domain into a number of major topic headings, and then group abstracts in this fashion in the monthly RIE Index.

The Consolidated Model may be the easiest to adopt, since the direct correspondence between old and new CHs could allow for a phased transition. We believe that any change in the network structure should be gradual, to avoid overloading the Central staff, but that the final structure should be announced well in advance in order to deal with the problems of those affected by marginal changes, and to improve the quality of interim planning by the directors.

CONCLUSIONS

1. Simply increasing the supply of primary literature will have little benefit unless more careful attention is paid to its evaluation and synthesis; therefore, evaluating and synthesizing the data base should be a minimum system objective.

2. The most glaring deficiency in current education literature is the lack of documents translating preferred programs and research findings into operational advice to practitioners.

3. Either the Consolidated or the Functional Model appears to offer immediate improvements in responsiveness without requiring undue transition costs. The Procedural Change, Divisional, and Centralized Models would each be deficient in important respects; the Regional Model is downgraded primarily because of probable transition and resource problems that need not be faced in order to meet these objectives.

4. Moving into the query response or service roles entails a considerable expansion of the management responsibilities and skills required in the network, and considerably more funds; yet we believe that someone will have to fulfill these objectives if USOE's teacher renewal strategy is to be supported by effective information dissemination activities.

5. If query response and personal service objectives are given higher priority at some later date, some form of the Regional Model should prove most effective; this Model could be implemented over the long term, using the Functional Model as the structural groundwork.

6. Whatever model and objectives are chosen, the findings indicate that some effort should be made to improve the interfaces between ERIC and other information resources, and that greater attention should be devoted to tailoring ERIC's products to its intended audience and evaluating the system's overall effectiveness.

Appendix A

ERIC TODAY

The purpose of this Appendix is to describe a variety of problems internal to the current ERIC structure, especially those that might be affected by a change in the CH network. Although many such problems do exist, any objective evaluation of the entire system would have to show that ERIC has made considerable progress in the last few years in improving the access which the education community has to this literature. Our interviews with users in the field convince us that if ERIC did not exist, many people would be trying to invent it.

The Education Resources Information Center (ERIC) is a national information system created and supported by the U.S. Office of Education to provide the educational community with improved access to the literature of education. It consists of three basic components: a management arm known as Central ERIC, a network of information clearinghouses (CHs), and a group of specialized commercial contractors.

ERIC has two primary products: (1) Research in Education (RIE), a monthly index listing and abstracting new research reports, and (2) Current Index to Journals in Education (CIJE), a monthly index of articles in about 500 professional journals. The system sells microfiche and hard copy reproductions of reports not readily available through an alternative source, and computer tapes of the entire set of indexes. There are over 6000 subscribers to RIE and 450 standing orders for the full microfiche collection.

SYSTEM OVERVIEW

Central ERIC consists of a management staff of about six men in the Division of Information Resources of the National Center for Educational Communications (NCEC). This staff monitors and reviews the annual contracts held by each CH and commercial contractor in the system. Central ERIC also sets policy guidelines for CH operations, determines the annual budgets of each CH, and decides when a new CH should be opened or an existing one closed.

The ERIC CH network currently comprises 19 separate and independent CHs, each chartered to cover a particular subject area of the educational literature.

With only a few exceptions, CHs are entirely funded through annual contracts with the Office of Education. In general, each CH receives from $150,000 to $200,000 in funding per year, enough to support 10 to 15 fulltime employees. Most CHs are located on or near university campuses and, consequently, CH contracts are frequently subject to university administration and overhead assessments. Some CH employees, especially directors, may be part-time employees holding other positions (faculty, graduate students) with universities.

The CH network is the major avenue of contact between ERIC and the literature of education. Each CH collects, screens, and to a lesser extent, disseminates documents and reports on education. CHs also serve in a limited way as information centers and prepare a variety of information analysis (IA) publications.

The commercial contractors in the ERIC system perform a variety of processing, printing, distribution, and control functions.

The ERIC Facility Contractor coordinates system-wide document processing and transmittal programs, maintains and updates the ERIC file, acts as lexicographer for the system, performs limited computer searches of the ERIC file, and sells ERICTAPES (ERIC file on magnetic tape) to subscribers.

The ERIC Document Reproduction Service (EDRS) prepares and sells microfiche copies of ERIC documents on standing or special order, prepares and sells photocopy reproductions of documents on demand, and serves a limited function as the marketing arm of ERIC.

The CIJE contractor publishes and sells Current Index to Journals in Education and other related products developed from the ERIC data base.

The Government Printing Office publishes and sells the major product of ERIC, Research in Education.

CENTRAL ERIC

Central ERIC's principal functions are those of technical coordination, policy management, and CH performance evaluation. It establishes operating procedures, policies, and guidelines to insure the coherence of system-wide activities, and evaluates each CH so as to judge how much money a given CH should receive during a contract year and to identify exemplary practices for application throughout the network.

Each CH enjoys some autonomy, which gives CH directors much latitude in determining local goals, objectives, and activities. In theory, therefore, the management function of Central ERIC is primarily to generate broad policy and procedural guidelines, and monitor CH performance to insure conformity with these guidelines.

In practice, several problems have rendered this management policy difficult and partially ineffective.

First, communication from the CHs to Central ERIC is very weak. Central ERIC staff have neither the time nor the resources for deep discussions with CH directors concerning their problems. Consequently, many directors are reluctant to voice their opinions or ask for advice when issues involving Central ERIC policy and CH activities arise.

A second and very important problem is the inherent difficulty of establishing overall performance standards for CH activities. Without such standards, CHs can be judged only on a subjective basis formed through close professional association and understanding, impressions, semi-intuitive judgments, and word-of-mouth commentary from non-ERIC observers. But again, the resources required for professional evaluation of each CH are beyond Central ERIC's capacity. Clearly, this renders the citation of exemplary practices and the rectification of deficiencies difficult at best. Equally important, it compounds the already difficult problem of dividing a budget among competing CHs when each CH represents a different topical area of educational enterprise.

Evaluation is further complicated by the close relationships that many CHs form with professional organizations and, occasionally, other government programs. The allegiance of some CHs to their professional affiliates endows these organizations with significant influence and

control over CH goals and policies. This is particularly true when an individual director's loyalties are focused outside ERIC, or when a director comes to regard Central ERIC policy directives as ambiguous, ill-defined, or unresponsive to his needs. On balance, it is often difficult for Central ERIC to tell what the "real" goals and objectives of CHs are because of the obscuring influence of other organizations. It should be emphasized, however, that close professional affiliations have traditionally been encouraged because they hold several immediate advantages for the CHs. These advantages are described in more detail below.

A final obstacle to Central ERIC's management policies, and one closely related to those mentioned previously, is the difficulty of establishing genuine communication with CH directors. Because Central ERIC has neither the resources necessary for thorough discussion nor a detailed enough understanding of day-to-day CH activities to offer convincing argument and informed counsel, Central ERIC directives often strike CH directors as fallacious or insensitive to their problems and points of view. This in turn diminishes their respect for Central ERIC's judgment and further retards effective communication. More important, it reinforces the tendency of some directors to turn to external organizations for support and advice.

In summary, Central ERIC's "management-by-guideline" policy has engendered the following problems:

o Insufficient familiarity with the specific practices and problems of CH operations has made effective evaluation difficult.

o Insufficient and ineffectual communication between Central ERIC and individual CHs has intensified this information problem, the result being diminished CH respect for Central ERIC's judgment and a further retarding of communication.

o Overdependence of some CHs on their professional affiliates has divided control and obscured CH goals and objectives.

THE ERIC CLEARINGHOUSE NETWORK

The CH network is of course the most important component of the ERIC system. Most ERIC activities not associated with data processing

or document reproduction are performed at the CH level under standards and procedures largely based on the judgment of CH directors. The major functions and responsibilities of any CH fall into four basic areas:

- o Literature acquisition and processing
- o Origination and distribution of IA products
- o Professional relations
- o Service of requests from users.

Within these four broad areas, each CH performs a variety of tasks, often in a very individualized way. They are described in the following paragraphs.

Acquisitions Program

Each CH is charged with acquiring the so-called "fugitive literature"* in its particular subject area, which it does by soliciting documents from originating authors and organizations. Authors are usually identified by reviewing journal literature, conference proceedings, membership lists of professional organizations and, in a few cases, through the professional activities of CH staff members. These authors are then contacted by mail and requested to submit their publications to the CH for possible inclusion in the ERIC literature base.

With the exception of documents coming from the U.S. Office of Education and other government agencies, which are acquired through Central ERIC, the ERIC literature base is entirely acquired by individual CHs. Consequently, the effectiveness of the ERIC acquisitions program depends substantially upon the aggregate performance of the CH network. Viewed from this perspective, the ERIC acquisitions program has several important characteristics.

First, it is entirely voluntary; that is, ERIC must rely on the cooperation between originators and CHs to develop and maintain a literature base. This cooperation extends beyond a simple transmittal of a solicited document since, at present, roughly one of every three

*Literature which does not appear in readily available publications such as journals and textbooks. A typical fugitive document might be a study or research report commissioned by a government agency.

ERIC documents is obtained without solicitation. Because it is voluntary, the success of the program largely depends on ERIC's visibility and esteem in the educational community.

The second characteristic derives from the fact that each CH runs its own acquisition program: Both the sources and kinds of materials acquired vary greatly among CHs. Some CHs try diligently to acquire dissertations while others do not; some have foreign acquisitions programs although most have not; some have well-developed programs for acquiring the published results of local-level experimental projects, while others view these programs as too time-consuming to be worthwhile.

A third characteristic derives from the 19 CH subject responsibilities. Because of gaps in coverage or overlap in subject responsibility, ERIC has been slow to respond to some emerging topics in education either because no CH had direct responsibility for the topic or because it was unclear which CH should absorb the topic. ERIC's slow response to such topics as drug abuse, the environment, and penal education has been cited as a case in point.

One last characteristic of the ERIC acquisitions program is the relative failure of the CH network and Central ERIC to acquire consistently the publications of other domestic and some foreign organizations. Our interviews with members of the educational community, both inside and outside ERIC, have indicated a general conviction that ERIC is missing much fugitive literature of importance. In particular, ERIC has not acquired many publications from regional labs, R&D centers, English-speaking foreign governments, and other organizations within USOE. Not surprisingly, many individual researchers cite the same sources as the most difficult from which to get either publications lists or the publications themselves. ERIC's difficulties are therefore understandable, but this also means that ERIC is not taking full advantage of an opportunity to provide a valued service to researchers and other clients.

Document Processing

After a document has been acquired, the document processing phase of CH operations begins. The first step is a series of checks to

determine if the document printing is of reproducible quality, whether the document carries any copyright restrictions, and whether the document has already been acquired by another CH in the system.

Following these checks, the document is reviewed to determine if it is appropriate for inclusion in ERIC. The standards for acceptance are largely determined by the CH director, although he is seldom involved in the work of actual screening. Screening may be done by anyone from a nonprofessional staff member to a panel of subject "experts." If a document is judged inappropriate for ERIC, it is frequently retained in a local file or, more commonly, transmitted to a local library (e.g., a university education library) to be added to its collection.

The great variability in CH document selection standards can be traced to a number of sources. First, it is only natural to expect inconsistencies among directors. Although most directors insist that selection should be maintained at the CH level, many directors would prefer more definitive guidelines from Central ERIC concerning what kinds of materials should be accessioned. This is particularly true at CHs that maintain large local files, since they typically have the greatest selection of materials to choose from. Furthermore, it has been our experience that, in general, those CHs holding the greatest spectrum of materials are the least able to describe their selection standards. Although the evidence is not compelling, our conclusion is that selection at these CHs is often arbitrary.

Another factor affecting selection standards is what some directors have described as a "two-edged quota." Since the costs of document processing are largely the fixed costs associated with employing certain CH personnel on an annual basis, more stringent acceptance standards will, in a "dry year," yield higher unit costs for document processing. Furthermore, CH directors are aware of Central ERIC's recent interest in unit cost-of-processing data and, therefore, it would not be surprising if this is affecting their standards. Alternatively, the other edge of the reputed "quota" shows up when CHs submit significantly more than their typical monthly transmittal to the facility contractor. Such peaks in the workload have caused the contractor to request that future shipments be delayed until the excess documents can be spread

over future issues of RIE. The argument apparently underlying this procedure is that, without some limits, the size of RIE would soon grow unmanageable. In any event, some CHs have interpreted this policy to mean that there is a definite, although unstated, upper limit on their monthly transmittals.

Once a document has been accepted for ERIC, it is abstracted, usually in a style intended to summarize rather than outline its content. Each document is also indexed under major and minor descriptors the abstractor selects from the Thesaurus of ERIC Descriptors, a collection of approximately 7000 educational terms subject to lexicographic control. The indexing and abstracting operation, together with the review and editing of the final product, is performed in a variety of ways by the CHs. In particular, the training and supervision of an abstracter are virtually unique at each CH. (Most abstracters have no special background or expertise in the field of education, but most directors believe such expertise would contribute little to their performance.)

One aspect of the indexing/abstracting operation that deserves further discussion is the selection of descriptors from the Thesaurus of ERIC Descriptors. If the abstracter decides that no descriptor in the thesaurus is appropriate for a particular document, the CH may submit a new descriptor to the ERIC Facility Contractor. This central lexicographic authority reviews all candidate descriptors and accepts or rejects them according to system-wide rules and guidelines intended to assure clarity, brevity, and consistency in the thesaurus. The key aspect of this procedure is that, although the thesaurus is subject to central control, the actual "construction" of the thesaurus is a decentralized operation.

This discussion of the mechanics of thesaurus maintenance may seem picayune, but the subject is significant for two reasons. First, effective vocabulary control is vital to the performance of any retrieval system, and second, we know of no area of ERIC performance that has drawn more consistent criticism, both within and outside ERIC, than the ERIC thesaurus. The following are the commonest complaints against the thesaurus:

o It is too large and its hierarchical structure is unwieldy and confusing.

o Lexicographic control varies from one extreme to the other, depending on the ERIC facility contractor. Either there has been virtually no control or control is so strict that it is a waste of time to submit a Descriptor Justification Form (DJF).

o There are too many descriptors with redundant, illogical, or inappropriate meanings attached to them. This derives from the difficulty of coordinating the occasionally competing demands of different subject areas for particular descriptors. Much of this problem can be traced to previous periods of lax lexicographic control.

o The procedures surrounding the submission of a DJF and the conditions for their acceptance are confusing and discouraging to many CH vocabulary specialists.

After abstracting and indexing, the final step in CH processing is the accumulation of documents, their accompanying abstracts, and other descriptive paperwork into weekly shipments to the ERIC Facility Contractor. This contractor updates the ERIC file and continues the document processing to provide other contractors with inputs appropriate to their functions, e.g., production and distribution of microfiche copies.

The document processing described thus far has all applied to fugitive documents. The abstracts of these documents are ultimately published in the principal output of the ERIC system, the monthly Research in Education (RIE). CHs also prepare inputs for Current Index to Journals in Education (CIJE), which contains citations of articles from selected journals.

Statistically, a representative CH will acquire from 100 to 150 fugitive documents a month. Of these, only about one-third will pass screening and be transmitted to the Facility Contractor. About half of the rejects are retained in local CH files. A CH will also input from 150 to 300 journal articles to CIJE each quarter. The ERIC file, which now consists of about 80,000 entries, has thus been growing at the rate of about 25,000 RIE and CIJE entries per year.

ORIGINATION AND DISTRIBUTION OF INFORMATION ANALYSIS PRODUCTS

In addition to the literature obtained through individual acquisition programs, each CH contributes to the ERIC literature base through

the generation of publications called "information analysis (IA) products." In past years, an IA product could be any of a variety of publications ranging from an annotated bibliography to a state-of-the-art research paper. Beginning in 1972, IA products will be funded under two programs, a "discretionary" program identical to the past program except for its magnitude, and a "competitive" program to be administered under an entirely different set of guidelines and procedures. These programs are described below.

Discretionary Information Analysis Program

The discretionary program will be directed and administered just as the conventional IA programs of previous years have been. The single difference between the old and new programs is an anticipated budget reduction of approximately 50 percent. Because of this similarity, the discretionary program will be described in terms of the traditional program with the understanding that the only real difference between the two is a 50-percent reduction in activity level at each CH.

Within guidelines set by Central ERIC each CH has much latitude in selecting topics, authors, types of publications (e.g., bibliographies versus papers) and publication formats (e.g., documents versus filmstrips). Proposed IA products are reviewed each year by Central ERIC as part of the process whereby CH contracts are renewed, but the control exerted during this process is more in the form of guidelines than specific direction. A typical CH has in the past originated from 10 to 15 IA products a year.

Two factors strongly influence the selection of IA topics: the interest in a topic as evidenced by the trends in educational literature, and the recommendations and advice of survey groups, CH Advisory Committees, professional organizations, and professional colleagues. Many IA products tend to follow the observable trends and "hot topics" of the literature and in so doing rely strongly on both the availability of that literature and a firsthand familiarity with its content. The commonest objectives of these literature-dependent IA products are to identify significant publications on a topic (e.g., bibliography)

and/or to summarize their significant results in a style and format more easily understood by an audience with no special expertise in the subject area (e.g., a compendium paper on television in the classroom). Those IA products that do not rely strongly on the literature tend more toward state-of-the-art research than do their companion publications.

The intended audience of most IA products is the educational administrator and decisionmaker. While some products are directed at researchers and other practitioners, serving the needs of these groups presents special problems discussed in the body of this Report. Furthermore, as indicated earlier, the selection of an IA topic is often influenced by the recommendations of CH Advisory Committees and professional organizations. Typically, the membership of these groups reflects the interests and problems of the administrator/decisionmaker more than those of any other potential audience.

The authors for IA products are selected by the CH director, frequently with the advice of his Advisory Committee and those professional organizations and individuals with whom he is in contact. Most are commissioned to be written by non-ERIC personnel, although CH directors and other professional staff members occasionally write documents. Compensation for a commissioned paper usually consists of an honorarium of less than $1000, although higher sums have been paid.

IA products are printed and distributed in two ways. First, all IA products in the form of documents (as opposed to film-strips, for example) become part of the ERIC file and are therefore available on demand from the ERIC Document Reproduction Service. Additionally, many IA products are printed by and distributed to the membership of professional organizations affiliated with an individual CH. Although this distribution is limited by government regulation to no more than a few thousand copies, these copies nonetheless represent the largest "market" for many IA products. These ready markets and the relatively small printing and distribution costs charged to the CHs are regarded by many directors as major benefits that underscore the need for close ties with professional organizations.

Past IA programs have shown a number of weaknesses. The more important of these, and those most commonly raised by educators outside ERIC, are described below.

o To receive all the IA products he needs, the administrator or teacher must keep abreast of the publications of several CHs, rather than of a single "counterpart" organization.

o There is little coordination between individual CH IA programs. Even in the unlikely event he does keep in touch with several CHs, a typical IA user will seldom find his information needs addressed in a consistent and systematic way.

o The formats and topics of IA products are too strongly influenced by the specialized and sometimes parochial interests of professional organizations. These interests are by no means always the same as those of the broader body of constituents each CH is charged with serving.

o Partly because of their dependence on the literature and partly out of desire to avoid controversy, IA products tend to mirror the literature to the point where they may be "too little, too late."

o Too many IA products either have a state-of-the-art research flavor or are intended for administrators. More down-to-earth documents are needed that deal with the practical problems of teachers.

o Although there is near-unanimity concerning the advisability of having nonresearchers "enter ERIC" through IA products rather than RIE, the IA products themselves do not systematically reflect this thinking. Some IA products cite documents that are not available through ERIC, but do not specify other sources where they might be obtained. Others cite documents which, while valuable to researchers, may discourage and frustrate nonresearchers more than they help them. Finally, many users may not be aware of the existence of IA products unless they are also members of professional organizations distributing these products.

Competitive Information Analysis Program

As indicated above, the discretionary IA program will account for about half of ERIC's IA budget. The other half will be distributed on a competitive basis, with the competitors including but not limited to ERIC CHs. Central ERIC will select certain topics for their timeliness and significance, and then release RFPs describing the topic to be treated. Each interested CH will respond by submitting a proposal to

Central ERIC for competitive evaluation. In comparison with discretionary IA products, the competitive products will treat more focused topics and will generally be targeted at a more specialized audience. Further, the competitive topics will be more strongly influenced by prevailing issues and interests in the Office of Education. Finally, depending on their scope and difficulty, individual competitive products may receive as much as $30,000 to $50,000 in funding, far more than has been spent on individual discretionary products.

PROFESSIONAL RELATIONS

One of the major reasons for the original decentralization of CHs, together with the specialization of individual CH charters, was to facilitate the "building of bridges" between ERIC and professional organizations. This device has been successful, since CH charters closely parallel those of their counterpart professional groups, and since many CHs are located at or near geographic cluster points of professional activity.

CH staffs also increase their visibility to the professional community by attending conferences, distributing materials and brochures at various meetings, writing journal columns, and in some cases, publishing newsletters that highlight current CH activities.

ERIC derives several benefits from these close professional ties. First, ERIC gains a visibility that facilitates document acquisition and increases awareness of ERIC activities and services. Second, many CHs receive assistance from professional groups in printing and distributing IA products. Finally, these groups provide CHs with both formal and informal channels through which CHs can receive guidance and assistance in planning products and activities, as well as identify specific people to staff these activities. For example, the Advisory Committees of many CHs are substantially composed of officers of professional groups. These committees may recommend IA topics, suggest authors, and review and criticize suggested or completed IA products; on occasion, committee members will themselves write IA products. When it is necessary to find a new CH director, these committees often suggest nominees.

These benefits to ERIC are undeniable, but they come at a price -- notably the dominance of various CH activities by professional organizations. This dominance would be considerably less were it not for certain characteristics of ERIC's operation, some of which have already been discussed. In summary:

o Central ERIC has neither the manpower resources nor the day-to-day understanding of CH activities and problems necessary for expert advice and counsel in planning and management. Consequently, CHs tend to look toward professional organizations, with which they have closer and more constant relations, for this assistance.

o Communication between components of ERIC is sporadic and frustrating to many who attempt it. It is often easier for a CH director to communicate with a professional organization than with another CH, a contractor, or Central ERIC.

o Most directors view the planning and organization of IA products as the most interesting and challenging aspect of CH activities. Yet the only ready market for IA products is often the "captive" market provided by organization membership lists. If an IA product is inappropriate for a professional membership, CHs generally lack the resources to identify or develop alternative audiences unless they too are represented by a professional organization.

o One of the most compelling problems facing all CH directors is to determine who the actual users of ERIC are, what their needs will be, and how well ERIC is satisfying those needs. There are no definite answers to these questions, and virtually no reliable empirical data. What limited information CHs have has come almost exclusively from membership-feedback through professional organizations. Consequently, in an understandable attempt to find a constituency that "you know you can help," some directors have concentrated on the narrower constituencies of professional organizations at the expense of the larger constituencies they might be serving.

o Because the existence of any CH depends on both the budgetary fortune of the entire ERIC system and the annual renewal of its contract by Central ERIC, individual CHs may be operating in a precarious and uncertain environment. Under these conditions, the ability of a CH to

elicit testimonials-of-worth and to mobilize outside support for its continued existence is a major concern to a director. Because they are organized, those professional groups counted as "friends of the CH" can be invaluable in providing this support.

SERVICE REQUESTS

Recently, ERIC has been receiving requests for individual assistance at the rate of about 75,000 per year, with the vast majority of these received by individual CHs. The large number of these requests, together with the fact that about 10,000 of them were placed in person either during visits or by phone, indicate that ERIC devotes a significant portion of its resources to this function and that its activities in this area constitute a major avenue of contact between the system and the educational community.

The most common requests are for information on ERIC and what it does or information concerning a particular subject area or document. About half of all service requests originate from practitioners (teachers, counselors, supervisors), while another quarter originate from decisionmakers (administrators, superintendents) and information specialists (librarians, information scientists). Requests also come from people and organizations in the Office of Education, Congressional Committees, Presidential Commissions, and state and foreign governments. These are usually designated "priority requests" and enjoy extensive and individualized attention.

Nonpriority service requests, on the other hand, receive a wide spectrum of treatment. Many CH directors view the satisfaction of these requests as essential in maintaining good relations with the educational community and in determining the problems, interests, and viewpoints prevailing in it. Other directors feel that this function is outside the ERIC charter, and that even if it were not, ERIC does not have the resources to respond to these requests adequately. In general, however, inquiries concerning documents are answered whenever possible, and requests for information on a subject are usually answered with a form letter that cites one or two appropriate documents and [illegible]lls

how to order them from ERIC. While some CHs offer more extensive services, assistance beyond that described above is not commonplace.

At present, the central issues surrounding the debate over user service programs are, "What are the user's needs?" and "How are they best satisfied?" We have found no unanimity of opinion, either inside or outside ERIC, on either of these questions. On three more specific points, however, there is a consensus concerning ERIC's present user service program:

o ERIC must establish a consistent and uniform policy toward service requests. Under present policy, a user has little idea of what response to expect from any given CH. A telephone request to one CH may, as a matter of course, result in personal assistance from someone with a background in the appropriate subject area. At another CH, the requester may be given the phone number of a local education library and told to ask there for assistance. The problem is more than user confusion; once discouraged, a user may not return to ERIC and, worse still, may influence others not to try.

o ERIC should reexamine its policy of generally responding to user requests for information with citations of one or two presumably appropriate documents. The practitioner in particular is often ill equipped to articulate his problems in the perspective and nomenclature of those who originate documents. He may not know the right questions to ask, the kinds of answers it is realistic to expect research to provide, or how to understand the answers he gets. Consequently, CH personnel often find it necessary to form impromptu judgments of a requester's background, level of interest, and expertise. On balance, the present system offers significant potential for frustrating, discouraging, and dissatisfying many practitioners.

o ERIC must develop some means of gauging its success in dealing with service requesters. Of the 75,000 requests now expected each year, there is no way of telling how many come from repeat users and how many come from one-time users who will go away dissatisfied.

Appendix B

In addition to CH Directors, members of their staff, and Central ERIC personnel, the following individuals were interviewed as part of this study:

Mr. Max Abbott, Director
Center for Advanced Study of Educational Administration
University of Oregon
Eugene, Oregon

Mr. Greg Benson, Director
New York State ERIC Dissemination Project
New York State Department of Education
Albany, New York

Mr. Joe Blaney
Superintendent of Schools
Unified School District
Croton-on-Hudson, New York

Mr. Norman Boyan, Dean
School of Education
University of California
Santa Barbara, California

Mr. Henry Brikell
Vice-President
Institute for Educational Development
New York, New York

Mr. Mark Chesler
Institute for Social Research
University of Michigan
Ann Arbor, Michigan

Mr. John Church, Chief
Bureau of Program and Research Planning
California State Department of Education
Sacramento, California

Mr. Lou Cohen, Director
Bureau of Occupational Education Research
New York State Department of Education
Albany, New York

Mr. Don Davies
Office of Education
Deputy Commissioner for Development
U. S. Office of Education
Washington, D. C.

Mr. Richard A. Dershimer
American Education Research Association
Washington, D. C.

Mr. Art Dombacher
Asst. Superintendent for Research
Berkeley Public Schools
Berkeley, California

Mr. David Elliott
Education Consultant
Berkeley, California

Mr. Joe Forte, Director
Basic Education Data System
New York State Department of Education
Albany, New York

Dr. Bernard Frye, Dean
Graduate Library School
Indiana University
Bloomington, Indiana

Mrs. Marcia Garman
Research Analyst
San Mateo County Education Resources Center
Redwood City, California

Mr. Hendrik D. Gideonese, Dean
School of Education
University of Cincinnati
Cincinnati, Ohio

Mr. Peter Grimes
Curriculum Coordinator
San Jose Unified School District
San Jose, California

Dr. Sanford Glovinsky
Far West Regional Laboratory for
Education R&D
Berkeley, California

Mr. Ransom Hawley
Curriculum Coordinator
San Jose Unified School District
San Jose, California

Mr. Willis Hawley
Center for the Study of Education
Institute of Social Science
Yale University
New Haven, Connecticut

Dr. Paul Hood
Program Manager
Far West Regional Laboratory for
Education R&D
Berkeley, California

Mr. John Huber
Project Associate, ERIC User Study
Indiana University
Bloomington, Indiana

Mr. James Kelly
Ford Foundation
New York City, New York

Mr. Walter Kraus
Curriculum Coordinator
San Jose United School District
San Jose, California

Mr. Christ Lane
Education Analyst
California State Legislature
State Capitol
Sacramento, California

Mr. Michael Marien
Staff Member
Educational Policy Research
Center
Syracuse University
Syracuse, New York

Mr. Bernard Martin
Special Assistant to Deputy
Commissioner for Development
U. S. Office of Education
Washington, D. C.

Mr. Frank Mattas, Director
San Mateo County Education
Resources Center
Redwood City, California

Mr. William H. McCleary, Director
Information Retrieval Center
No. Colorado Educational Board
of Cooperative Services
Boulder, Colorado

Mr. Britton McFetridge
Social Welfare Program Analyst
California State Legislature
State Capitol
Sacramento, California

Mr. Howard Mehlinger
University of Illinois
Social Studies Program
Urbana, Illinois

Mr. Glen Nimnick
Program Manager
Far West Regional Education
Laboratory for Education R&D
Berkeley, California

Mr. Robert O'Hare
Southwest Regional Laboratory
Inglewood, California

Mr. Michael O'Keefe, Director
Washington Internships of Education
Washington, D. C.

Mr. William Paisley
Institute for Communications Research
Stanford University
Palo Alto, California

Mr. W. James Popham
Graduate School of Education
University of California
Los Angeles, California

Mr. Art Rookey, Principal
Nottingham High School
Syracuse, New York

Mr. Richard Schutz, Director
Southwest Regional Laboratory
Inglewood, California

Mr. E. Joseph Schneider,
Director of Information Office for CEDAR
Denver, Colorado

Mr. Peter Sherrill
Vice-President
Field Research
San Francisco, California

Mr. Harry Silberman
U. S. Office of Education
Associate Commissioner
National Center for Educational Research and Development
Washington, D. C.

Mr. John Steiglmeier
Director of Evaluation Data Division
New York State Department of Education
Albany, New York

Mr. Vic Tabor, Director
Division of Testing
New York State Department of Education
Albany, New York

Mr. Michael Timpane, Director
Education and Social Service Planning
Office of the Assistant Secretary for Planning and Evaluation
Deaprtment of Health, Education Welfare
Washington, D. C.

Mr. Robert M. W. Travers
College of Education
Western Michigan University
Kalamazoo, Michigan

Mr. Shelley Umans
Regional Planning Center
Board of Education
New York City, New York

Miss Cara Volkmor, Head Librarian
USC Instructional Materials Center
University of Southern California
Los Angeles, California

Mr. Charles Watts, Director
USC Instructional Materials Center
University of Southern California
Los Angeles, California

Mr. Carl Wedekind, Director
Division of Educational Research
New York State Department of Education
Albany, New York

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